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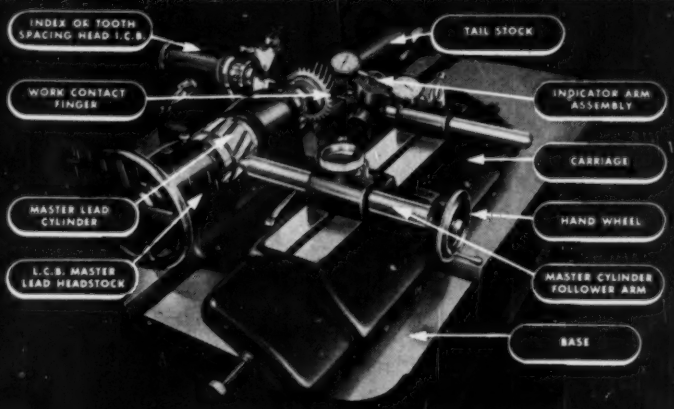

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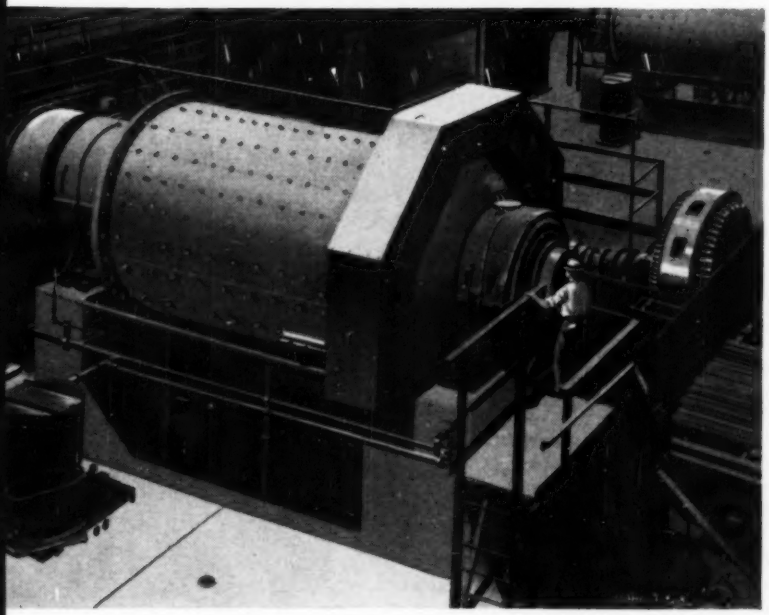

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IA-52-20E

BUSINESS TRENDS

SEVERE INFLATION no longer threatens the U. S. Prices may go up some in the spring and early summer. That is the normal seasonal pattern. But the outlook now is for wholesale prices to level off, and probably to decline, late in summer or early in the fall.

Change in the U. S. defense program is one reason for this outlook. The new defense schedule, calling for a lower peak of spending spread over a longer period, will free factories, materials, and manpower to work on civilian products. Result will be a greater flow of goods for consumers and nondefense industries—and thus less danger of inflation, less urgency to buy in anticipation of stock or material shortages.

The shift in defense plans has already brought bigger allocations of metal to nondefense industries, especially for automobiles, electrical products, and industrial-expansion projects. Most civilian industries are still getting less steel, copper, and aluminum than in the first quarter of 1952. But now the cutbacks will not hurt nearly as much as had been expected.

The head of one big electrical manufacturing company now thinks his 1952 civilian production may match that of 1951. Expected cutbacks were 25 to 35%.

The actual record this year may not turn out to be this good. But makers of television sets and automobiles should be able to beat 1951 rate of output by the fourth quarter—when large amounts of additional aluminum and steel will be available from expanded production facilities.

Restrained buying by U. S. consumers has helped fight inflation dangers. Consumers vastly increased their rate of saving last year, from 5.2% of income after taxes in 1950 to 8.3% in 1951. As a result, manufacturers built up big inventories of goods that would not sell. Some inventories still are not back to normal; they will help tide business over the next few months until bigger supplies of metals make possible substantial increases in production.

Big crops of basic agricultural commodities are expected this fall, too. They will further reduce pressure on consumer prices. And when the cost of living stops rising, pressure for inflationary wage increases will be weakened.

This outlook could be upset by a buildup in international tension or by a serious crop failure in the U. S. And some prices will rise this spring, partly as the result of increased wages in the steel, coal, transportation, and other basic industries. But in the absence of crop failures or renewed danger of war, inflation will likely go little further.

The new defense schedule means more U. S. exports of metal products. Shortages are not going to disappear over night. The record U. S. industrial expansion

program will keep many kinds of industrial equipment short right through the year. But with increased supplies of aluminum and steel available as the result of the reduction in defense needs, U. S. industry will be able to fill orders from abroad faster for both machines and for consumers' durable goods like automobiles and kitchen appliances.

This is good news for importers of U. S. goods. But some exporters to the U. S. may suffer as pressure for inflation drops here. Prices of some commodities will have to be adjusted to fit lower price and demand levels in the U. S. That means that more commodities can expect to repeat the recent experience of wool, rubber, fats, and oils.

U. S. TOURISTS will swarm to Europe this year—probably in the greatest number since World War II. Result will be a flood of badly needed U. S. dollars that will help fill the dollar gap.

Record level of U. S. incomes is the main force behind the expected travel splurge. And the Olympic games give Europe a special attraction. Finland expects 50,000 visitors in 1952, including 10,000 Americans for the Olympics alone. The rest of Europe will benefit as tourists travel to and from Helsinki.

Airlines are making travel still more attractive by offering lower fares. All the trans-Atlantic airlines are inaugurating "coach" service to Europe. Fare to London is $270 one way, compared to $395 for first-class travel. Round trip will cost $486 between May 1 and October 30, and only $417 the rest of the year. Airlines expect coach trips to help boost trans-Atlantic air travel to 500,000 passengers this year.

Ship travel is already relatively cheap—$165, tourist class. Space is the problem here. Ships cannot carry all the people who want to travel. So lines are adding new ships. The new superliner, S.S. United States, will add 100,000 berths starting this July. French, British and Dutch lines also plan additions to their fleets.

Latin America will get its share of the travel boom, too. It is still the fastest growing market for U. S. tourists. Air coach trips and expanded steamship tours may give Latin American business another boost.

ANOTHER SYNTHETIC—for shoe soles and heels—is a big success in the U. S. Synthetic leather soles and heels last almost twice as long as natural leather. And shoe manufacturers find that substitutes are easier to handle in the factory, can be worked with less waste. Substitutes are being used in one-third of new shoes now, may get into half of shoes being made next year. Competition from newly-developed synthetics recently helped push hide prices to the lowest levels since the end of World War II.

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THE Collins high frequency radio equipment in this 18,000-pound load which went aboard at La Guardia field has now extended PAA radiophone operations throughout Africa. The three new stations are set up at Leopoldville in the Belgian Congo, Salisbury in Southern Rhodesia, and Johannesburg, South Africa.

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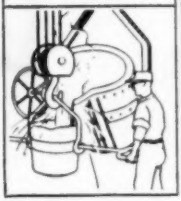	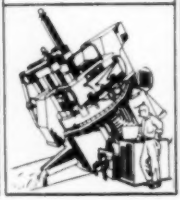	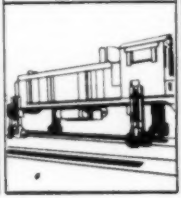	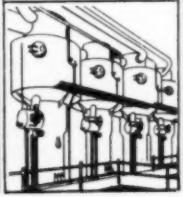	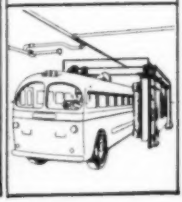

WASHINGTON REPORT

WESTERN-REARMAMENT STRETCHOUT will take some pressure off the free-world economy. You will see this most in the field of strategic raw materials Civilian demand will keep employment and production generally high. But strategic-materials shortages already have begun to pinch less. The outlook is for stabilization of prices at about the present level, according to findings of Washington analysts.

Chile is having trouble unloading its non-IMC-allocated copper. European black-market copper prices have sagged to 40 cents a pound from a high of 65. The Chileans are talking about selling their free copper at U. S. ceiling prices plus a 6-cent-a-pound export tax.

Lead prices have slumped to the U. S. ceiling. Zinc prices are approaching it. Aluminum supplies are bound to be eased later this year as new production comes in and less aluminum is put into airplanes because of the defense stretchout. Many types of steel already are in good supply and new capacity will be in production by year's end. Only sulfur promises to remain drum-tight.

This does not herald any slump in the raw-materials market, Washington analysts say. Prices may even firm up a little after speculators finish unloading their stocks.

And defense expenditures will be high enough to support at least present price levels for a couple of years to come. The stretchout, it should be realized, does not cut back military goals. It just spreads the procurement over a longer period.

The Pentagon originally wanted defense expenditures to hit a peak of $7-billion a month, to be continued for 6 months. Now the peak, which will be reached toward the end of this year, will be only about $4-billion a month. But this spending will be maintained for at least 18 months.

Raw materials for defense production are bought 6 months to a year before deliveries. So present raw materials prices already reflect future peak military spending. Some easing of Government controls on materials for civilian production will follow stabilization of the raw-materials market. Export controls also will be slacked off a notch or two. But do not expect much relief before the third quarter of the year.

The European rearmament stretchout also will help stabilize the world raw-materials market. The slowdown was made official at the Lisbon NATO conference. European rearmament efforts will be shaved some this year. But the big drop will not come until later on.

No major new military production projects will be started in Europe. Most of the guns for the European armies will come from the U. S. during the next few

years. Some arms will have to be taken away from U. S. home troops to meet the shipping schedules.

Increased U. S. arms shipments will widen the dollar gap this year. Washington trade experts expect U. S. exports to hit $17-billion worth, imports only $10- or $11-billion. But the dollar gap cannot spread much without exhausting European monetary reserves. So it will have to be plugged with aid if European rearmament is not to be cut still further.

The military meaning of the Lisbon decisions is this: Western Europe will not be defensible until at least 1955 or 1956.

Only about 25 of the 50 divisions Eisenhower has been promised by year's end will be combat-ready. Most of his promised 4,000 planes will be World War II types. They will be matched against 8,000 modern jets lined up for the takeoff along the Iron Curtain. Western jets will not start coming off the assembly lines in quantity until late 1953. Western European air bases from which to launch them will have to be built.

German divisions will not begin to take the field until the end of 1953—despite Lisbon agreement on the European army. There is still a lot of parliamentary paper work to be cleaned up. And the collapse of the flimsy Third Force regimes in either France or Germany could tear up all plans that have been drawn up for German rearmament.

This will postpone a crisis with the Russians over German rearmament for at least a year.

But the slower Western military buildup will also:

- **Postpone hopes** of a settlement of the cold war through negotiating from strength.
- **Rule out any aggressive U. S. moves** in China or Korea, such as loosing Chiang against the Chinese mainland.

WORLD BANK, Washington still hopes, will succeed in settling the Iranian oil crisis. Mossadegh now is willing to let a trust agent run the oil industry under agreement with the bank and Iran. The agent would be a businessman, probably American, with enough prestige to attract skilled technicians. He would be allowed to hire British technicians on an individual basis, could sell the oil to Anglo-Iranian.

Britain might buy this setup. But prices would be a big hurdle. The British and Iranians still are about 40 cents a barrel apart on price. And Britain is in no hurry to raise the ante as long as it is getting dollar oil and dollar aid from the U. S.

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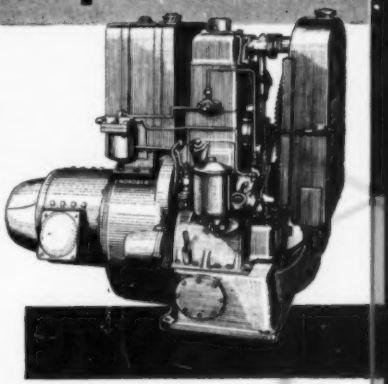

● **FOR MAIN OR STAND-BY ELECTRIC SERVICE**

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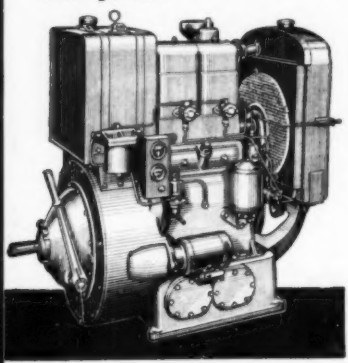
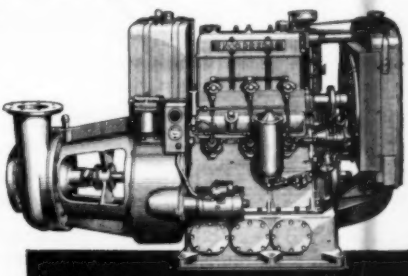


● **FOR DIRECT POWER DRIVE**

Nordberg Diesel Power Units offer from 10 to 45 hp for a wide range of straight power requirements including replacement power units. Available for direct drive with clutch or stub shaft power take-off. Speeds from 1200 to 1800 rpm.



● **FOR PUMPING**

Nordberg Diesel Pumping Units combine low cost, reliable power with efficient centrifugal pumps for practically all pumping jobs. Users report tremendous savings over gasoline powered pumps. Capacities from 200 to 3200 gpm. at 20 to 220 ft. head.

Write for literature.

Nordberg offers a full range of engine types and sizes from 10 to 10,000 horsepower.

NORDBERG MFG. CO., Milwaukee 7, Wis., U. S. A.

CABLE ADDRESS: NORDBERG

NORDBERG THE WORLD OVER

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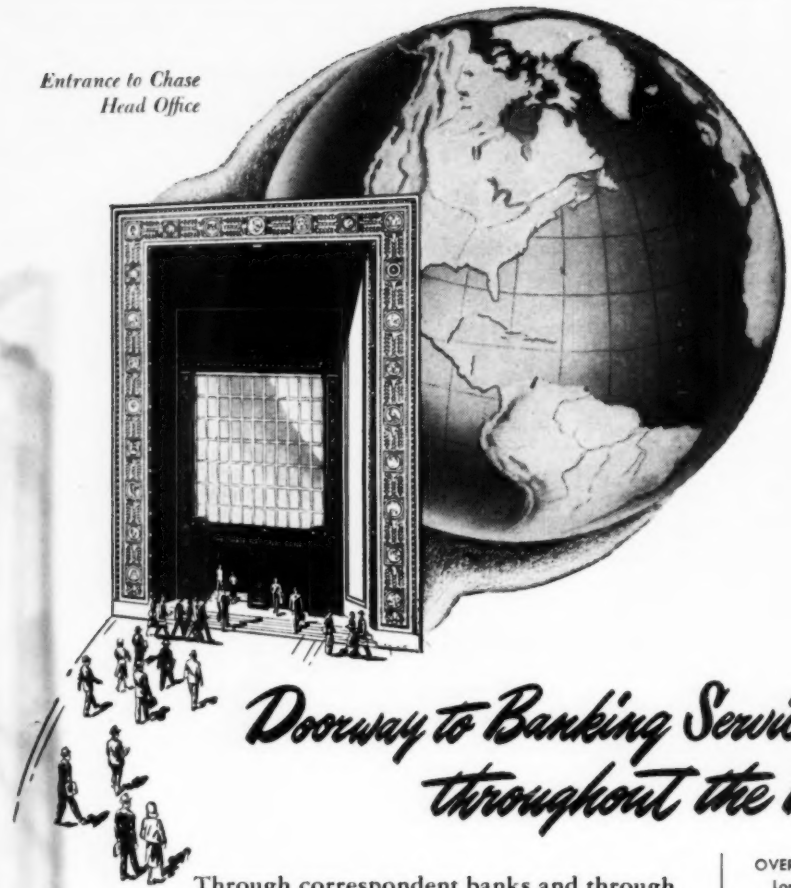
Entrance to Chase Head Office



Doorway to Banking Services throughout the World

Through correspondent banks and through branches and representatives, *Chase* provides banking facilities in every part of the world reached by American business. Current trade information from every commercially important area is gathered from these sources for the benefit of exporters and importers and other *Chase* customers. More and more businessmen every day are saying,

it pays to do business with Chase

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THE CHASE BANK

Paris

April 1952 • McGraw-Hill DIGEST • Volume 7 Number 4

CALCUTTA, INDIA—Native employees at Remington Rand's typewriter assembly plant make final inspection and test before shipping. This typical assembly plant is one way . . .

RemRand Exports Efficiency

Remington Rand know-how covers the world as its office machines, supplies, and systems step up the pace of business

AMERICAN BUSINESS in 1898 was far from the streamlined, smooth-functioning instrument of prosperity that it is today. Business men lost precious time in their cluttered offices, endlessly thumbing through ledgers or picking through dusty letters in search of needed information.

It was then that a bank cashier, James H. Rand, Sr., decided that if American business were to expand, it had to be supplied with devices to make it faster moving and more efficient.

From this idea, he developed the first visible index equipment. No longer was it necessary to scratch through blind files; data now were right at the workers' finger tips. Constant improvements of his invention soon resulted in a visible record system that combined the best features of the loose leaf ledger and the card-in-the-box record.

Business pioneering seemed to run in the family. In 1915, James H. Rand, Jr., after demonstrating his sales genius with his father's company, branched out with an invention of his own—Kardex. He organized the American Kardex Co. and brought to American business "facts at a glance."

Then in 1925, the Rands, father and son, joined forces to form the Rand Kardex Co. Later, the long established Library Bureau, originators of the first vertical filing system, and the Safe-Cabinet Co., originators of fire-resistant

***HILLINGTON, SCOTLAND** — Batteries of drill presses are machining parts for standard and portable typewriters and electric shavers. Much of the output is exported to help Britain's drive to improve its foreign exchange position.*

record-keeping equipment, joined the group.

But the actual beginning of the many background developments that give meaning to a trade name had really taken place in 1873 when a working model of what was to be the first practical typewriter reached the hands of E. Remington and Sons, New York gunmakers. And the long story of the Remington typewriter is a story of service, from the bringing of women into the business world to the streamlining of business correspondence and the present-day Remington typewriter.

Company Organization

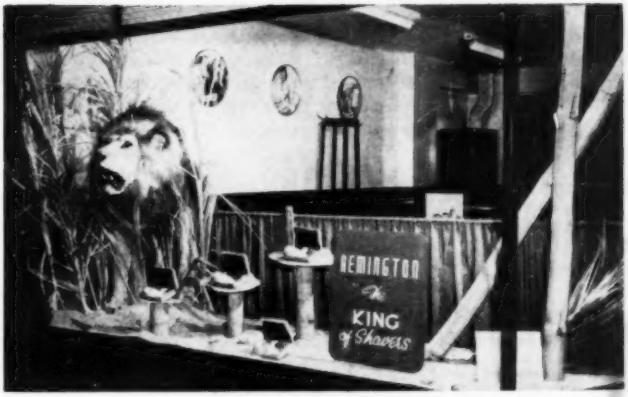
In 1927, Remington Rand Inc. was organized to bring together in one unified company the outstanding manufacturers of all types of office equipment. It added the Remington Typewriter Co.; Dalton Adding Machine Co., originators of the first modern ten-key adding machine; Powers Accounting Machine Co., inventors and developers of the mechanical tabulating machine; Baker-Vawter Co., which introduced the first loose leaf ledger; Kalamazoo Loose Leaf Binder Co.; and a number of other office equipment manufacturers.

Later on, photographic recording and copying equipment, duplicator supplies, the famous line of Remington electric shavers, and numerous other products joined the growing list of Remington Rand products.

The economic result of this unification have been far-reaching. Today, when Remington Rand Inc. advertises "Wherever you are—Remington Rand 'Know-How'", it stands behind this statement with 361 branch offices with sales organizations on five continents, together with 15,000 exclusive distributors and dealers on six continents.

This world-wide organization, represented in every community of more than 4,000 population, and in nearly every country on earth, depends on 32 plants in strategic world locations to furnish its complete line of business products. Known as "the business that serves all business", Remington Rand is the world's largest manufacturer of business machines, systems, office equipment, and supplies.

It provides the business world and governments with more than 20,000 different products. The wide diversity of machines and systems ranges all the way from carbon paper to industrial color television units, such as the Vericolor, and even to the UNIVAC—the



LONDON, ENGLAND — Remington Rand's export consumer marketing section directs its whole efforts toward stepping up sales of consumer products. This window display pushes shavers at the London shaver service station.

electronic computer that solves the most intricate and complex problems in scientific and commercial fields.

Among the many other products are punched-card tabulating machines and systems; Foremost bookkeeping machines, adding machines, and printing calculators; Kardex Visible systems; fire-resistant, insulated Safe-cabinets and files; standard, noiseless, portable and Electriconomy (electric) typewriters; filing systems for every filing need; Film-a-record microfilm equipment; offset duplicator supplies; carbon paper; and ribbons.

By examining time-worn methods, planning new procedures, integrating systems and equipment, Remington Rand for over 70 years has simplified record-keeping and administrative-control operations. Every effort is made to supply the machines and systems needed in our present economy and that required for the industrial and economic development of the nations of the free world.

The export business of Remington Rand and its affiliated companies has always been one of its major operations in carrying its products to the far corners of the globe. The Remington branch in London, England, was opened in 1886, other branches and agencies were quickly established, and by 1890 distribution had been accomplished in all of Europe; the rest of the world followed. In each country, as offices were opened, Remington established special schools to train typists, incidentally teaching shorthand at the same time and turning out trained women secretaries.

In 1885, Remington manufactured the first Russian typewriter. Remington then pioneered keyboards for many foreign languages including Arabic, Hebrew, Marathi, Burmese, Siamese, and others too numerous to mention.

Healthy-Trade Needs

Remington Rand has built its worldwide plans for the future on firm convictions—that universal economic well-being is the solution to healthier trade relations and greater prosperity for all . . . and that those countries so adversely affected by the recent war are now on their way toward recovery and economic stability.

Remington Rand conducts its overseas business on the philosophy that it is a citizen of each country in which it is located, and, as a citizen, has a definite stake in rebuilding and strengthening the national economy of that par-

ticular country. To carry out this aim, the company exports from these countries a substantial portion of Remington Rand's overseas production, thus creating a healthy foreign exchange vitally needed for sound international economy.

Varied Product Demand

The export program of the company helps build up a demand for not just one product of a country, but for a number of products. Most people think of Remington Rand as a typewriter concern, which of course it is, but in addition to typewriters, the company's European plants make numerous products for the wide "supplies" line and the vast "systems" record-keeping line, as well as the popular line of electric shavers.

In Great Britain, there are four manufacturing facilities. At Weybridge, England, several types of Kardex and other record-keeping equipment are produced. At Park Royal, Remington Rand makes carbon paper and ribbons, tabulating card files, file holders, Kardex cards, and hundreds of different printed forms. At Hillington, Scotland, Remington standard and portable typewriters and electric shavers are manufactured. A substantial portion of the output is exported.

Holland Plant—100% Dutch

The company's typewriter plant at Zeist, Holland, is the only one of its kind in the country; it employs 100% Dutch labor. The plant of Remington Rand's associated company in Frankfurt, Germany, has been completely rehabilitated and is once more engaged in producing the famous line of Torpedo standard and portable typewriters. A tremendous job was accomplished in Frankfurt in rebuilding an almost completely destroyed factory and restoring production facilities.

At Saarbrucken, too, a plant demolished by war was completely rebuilt. It helps supply France with much needed filing cabinets and Kardex visible record equipment as well as many other items essential to efficient business and government administration.

As an expedient means of producing machines in France, Remington Rand purchased the assets of a company manufacturing typewriters at Lyons. In less than a year, with the same number of employees, the company was able not only to improve the quality of the existing French product, but also to double its production with an expenditure of less than 5% in additional tooling. Or, to put it another way, worker productivity was doubled, not by purchasing elaborate machine tools but primarily by changing the methods of the workers.

Buys Swedish Plant

Early in 1950, a well-established company in Stockholm, Sweden, was acquired. This company manufactures and distributes a line of office equipment; its output is now augmented with the production of Kardex and related products.

In November 1951, Remington Rand announced plans for establishing a plant for the manufacture of typewriters at Naples, Italy. Starting this plant is in line with the company's policy of developing foreign manufacturing operations in countries where either lack of dollar exchange or licensing restrictions do not permit the purchase of products from the U. S.

The introduction of American machines is regarded as another important step in rebuilding Italy's post-war economy. The rehabilitation and expansion of facilities in Europe, while costing Remington Rand millions of dollars, is considered a thoroughly sound investment.

Remington Rand is expanding in Latin America too. The economic

growth of practically all Latin American countries is continuing at an almost unbelievable pace, bringing with it stronger industrial economies and better standards of living. So Remington Rand has made elaborate plans for further expansion there of the company's various manufacturing and merchandising programs.

Brazil—A Large Market

Brazil represents one of the largest markets for office equipment. In that country, Remington Rand operates a sizeable manufacturing plant for Kardex, files, and other "systems" products as well as a typewriter-ribbon plant and a printing plant for business forms and stationery. And it intends to expand the Brazilian operation with a proposed plant for producing carbon paper and other products.

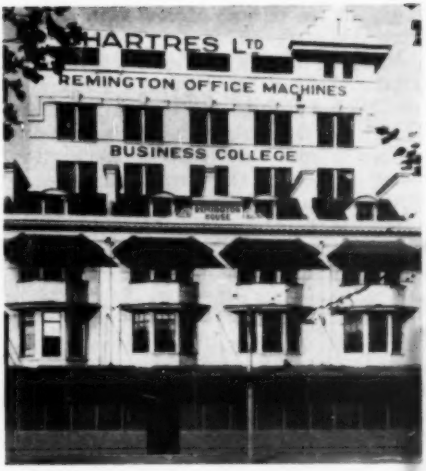
In Argentina, Remington Rand has recently made a financial and technical investment in a large prominent producer of typewriters. There too, considerable expansion of activities is planned for the near future.

A manufacturing plant in Mexico City produces Kardex equipment and other supplies, and assembles typewriters and adding machines for Central America and the Caribbean countries.

Now Going into Japan

The first industrial unit to be set up in Japan by American interests since the war was announced by Remington Rand in the spring of 1951. The new company, affiliated with the Nippon Typewriter Company of Japan, which for 30 years has been the leading manufacturer of Japanese and Chinese language typewriters, will make and distribute business machines. This arrangement is in accordance with the U. S. Government policy that encourages the industrial development of friendly nations.

At Calcutta, India, a Remington typewriter assembly plant served well in war as well as in peace. When the production of typewriters ceased during the war, this plant in common with the other Remington Rand plants located throughout the world immediately switched over to the manufacture of munitions. Today, the plant is once again manufacturing typewriters at an accelerated production rate.



SYDNEY, AUSTRALIA—Special business schools have been established in many countries to train typists. This one has been in operation in Sydney Australia, for 65 years.

Most of Remington Rand's operations are direct branch sales offices in foreign countries. In the past few years, some of the distributor-dealer organizations have been shifted to company-operated branch sales offices. However, it is not the company's intention to eliminate completely their present distributor-dealer setup in countries where broader distribution of the company's products is obtained.

In many European and Latin American countries, the direct branch sales operations are guided by either native personnel, long associated with the com-

pany, or sales executives transferred from the home office.

Many of today's Remington Rand distributors were the original distributors for the Remington Typewriter Co. These organizations have been intimately associated with the Remington name for over 60 years. This continued successful association is indeed a tribute to the business relationship that exists between these distributors and Remington Rand.

Selling Consumer Goods

To get the volume sales needed in the marketing of its consumer products, Remington Rand has set up an export consumer marketing section. This section, operating through branch sales offices, handles the distribution and sales of all models of electric shavers and portable typewriters, together with other products in some markets. It devotes its entire effort toward capturing an even larger share of the existing market by increasing distribution through dealers, dealer sales training, more effective display of products, and advertising directly to the public.

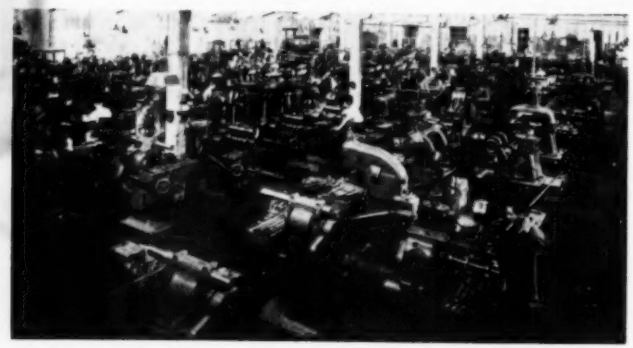
The company recognizes that selling business machines is more than taking orders. So Remington Rand sales representatives everywhere must undergo a training period to provide a solid foundation on which to build their careers. The company conducts sales training courses and seminars for both domestic and foreign sales representatives.

Selected representatives visit the U. S. for an intensive course of training at the Remington Rand National Sales Training Institute. Other sales training programs are conducted in the field, all following established and proved procedures.

In learning about Remington Rand products and their applications, these men receive first-hand knowledge of the administration of all types of business. Salesmen are trained by experienced, highly expert instructors, each a specialist in his field.

Sales training is continuous. Home-office instructors from the export division constantly travel the world, conducting "refresher" courses and seminars at branch sales offices and for distributor-dealer organizations. This sound and extensive business education provides Remington Rand salesmen everywhere with the background needed to make surveys for installing new administrative records for business and government.

Behind all this intensive training are the company's all-comprehensive files of case histories covering problems and their solutions in business and government record-keeping and administrative



LYONS, FRANCE — This busy machine shop is in the Lyons plant recently bought by Remington Rand. In less than 1 year, worker productivity was doubled with less than 5% in additional tooling. It was done almost entirely by improving factory methods.

OSLO, NORWAY—In September 1951, this exhibit showed Remington Rand tabulating equipment in Norway for the first time. It was arranged by Kardex & System A/S.

control—a constant fountainhead of information. It is a source of tested methods, techniques, and systems pioneered by Remington Rand to save countless hours of time and incalculable sums of money for business organizations and government departments, bureaus, and ministries.

The sales effort is backed up by expert servicing of Remington Rand products—anywhere, anytime. Sales and service are identical twins in the vast network of branches and exclusive distributorships.

In service, as in sales, top efficiency is gained by training. Service schools are held at all branch offices and distributor organizations by home-office mechanical-service personnel. Also, service personnel from every branch office and distributor organization are sent to the company's manufacturing plants in the U. S. and other countries for on-the-spot training in maintenance and service of machines.

Behind sales and service stands the company's research program. To further this broad program of research, development, and new-product achievement, Remington Rand built an ultramodern Laboratory of Advanced Engineering, the only laboratory in the world solely dedicated to the invention and development of new business-administrative products.

From Skill to Service

Some 300 research scientists and development engineers at the laboratory combine their varied skills—electronic, photography, metallurgy, chemistry, plastics—to seek out and perfect new administrative-business tools to provide better service and equipment for business and governments.

The activities of this unique laboratory augment but do not replace existing laboratories. The established company principle of decentralizing continues; each division is responsible for engineering and improvement of its own existing products.

Remington Rand's program of imparting to interested business and government personnel the essential facts regarding its business machines, sys-

tems, and supplies and their application to the general record management phase of their operations has been enthusiastically endorsed by business and government leaders.

Seminar Program

This program, in the form of seminars, is adapted to the needs of individual business organizations or government departments. The seminars consist of a series of lectures and demonstrations of record-keeping methods and equipment given by Remington Rand specialists to groups of business and government administrators and their clerical staffs. The seminars vary in length of time, depending on the character of the group and the instruction required.

Throughout the world, both home-office and branch representatives conduct these seminars to provide detailed presentations of machines, record-keeping systems, and supplies and to point the way to more efficient operations at lower costs. The ideas developed by the entire Remington Rand organization are presented freely in the hope that they may provide constructive benefits for businesses of all types and for governments.

During the past year, special seminars were held in Washington and New York for executive personnel from many foreign countries. These executives were members of productivity teams jointly sponsored by overseas governments and the Economic Cooperation Administration.

Seminars Successful

When an Italian industrial organization team visited New York and the Remington Rand offices, the team captain commented, "This visit has enabled us to collect extremely interesting information and highly valuable suggestions about the administrative and industrial criteria through which you have organized the works in your plant."

Labor and management executives from Denmark were guests at a seminar on office management and operations. The group reviewed a work-simplification program for increased office efficiency, controlled charting, and commodity classification covering the control of inventories.

Engineers, economists, and junior executives from French industries completed a 7-day seminar of modern business-administration techniques held in New York. One of two productivity teams from France, the group investigated all aspects of marketing, cost accounting, industrial relations, and related subjects.

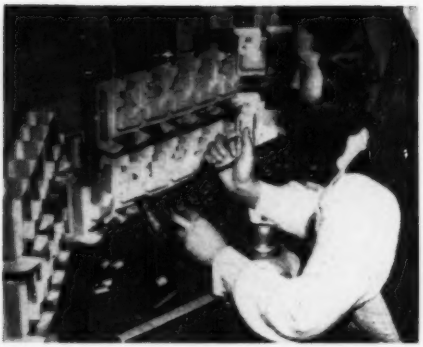
Know-How Cooperation

Recently when 300 top European industrialists made a 2½-week flying tour of U. S. manufacturing and production plants, inspection of the Remington Rand and typewriter plant at Elmira, New York, was an attention-getting stop on the schedule. The visitors, representing more than a dozen European nations, viewed volume-production techniques and assembly-line procedures that might give the great productivity so badly needed by their countries in manufacturing.

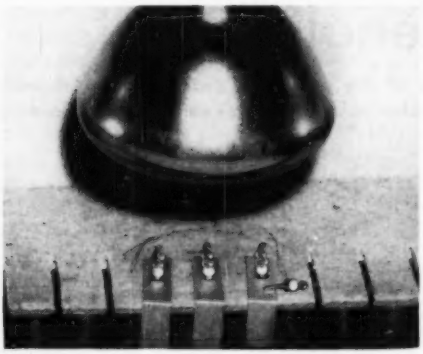
Sharing of technical know-how this way naturally follows the company's belief in the importance of world trade. A few years ago, James H. Rand in welcoming executives of the world-wide Remington Rand organization at an international executive conference put it this way, "If business assumes an aggressive leadership in world trade, the result will be a stronger bond of friendship and of cooperation among those nations that believe in private enterprise." That belief makes a firm cornerstone around which to keep building both sales and manufacturing operations on a global scale.

Factory Kinks

. . . on the manufacture of electronic equipment can be applied to many other production jobs.—Electronics, Feb



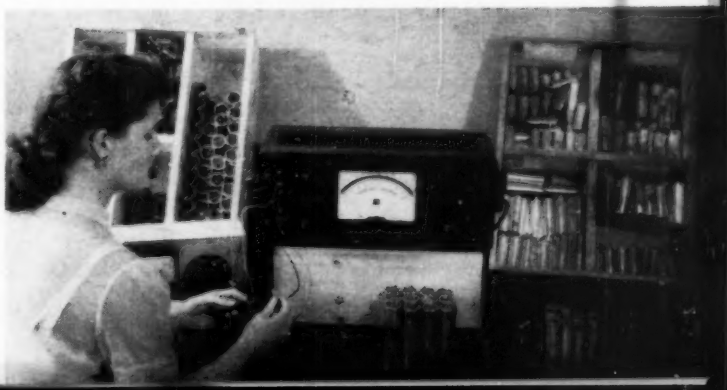
SMALL PARTS—Operator can easily reach many different small parts kept in cheap metal match safes that proved handier than other types of holders.—p220

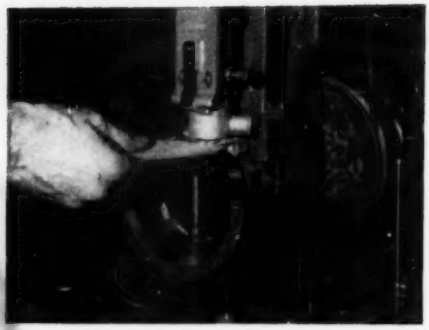


SOLDERING—A 375-w. Sylvania infrared reflector lamp supplies heat for soldering hermetic-seal terminals to pulse-transformer cover. Big advantages are uniform heating of glass and metal.—p264

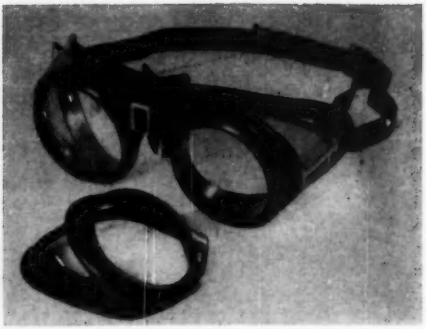
EXTINGUISHES FIRE—Rosin-pot fires are quickly put out when the heat melts a catch that releases metal lid. Catch is conventional window-closing link commonly used in factories.—p224

CAPACITORS—If you have to check purchased electrolytic capacitors for high loss, this meter combined with a resistor can find the defective units. It is a Technology Instrument Corp. 320-A phase meter.—p244





SHOE SOLES are prepared on rotary machine equipped with rubber-phenolic wheel



EYE CUPS of these safety goggles have screens riveted in place without breakage

Why Rubber-Phenolics?

Blends take advantage of the desirable characteristics of each material, open new product possibilities for compression molding

DEVELOPMENT of buna-N or acrylonitrile-butadiene rubber provided a material that would blend with certain phenolic resins. Blending them produced a plastic that had the hardness, strength, and short cure of the resin, and the toughness of the synthetic rubber.

The nature of the rubber-phenolics permits them to compete with metals, wood, ceramics, thermoset laminates, and straight phenolic molding materials. Molds for general-purpose phenolic materials are suitable for the rubber-phenolics. Shrink allowances have been set for some of the blends.

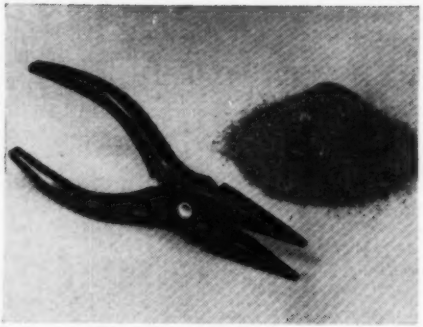
The relative resiliency of the material on release from the mold requires careful design and location of knock-out pins. Where great accuracy is desired, shrink fixtures are frequently used. One molder reports that afterbaking might relieve strain.

Molds should be chromium-plated to aid in releasing the part and to prevent sticking. Heat control is critical. The best molding temperature is between 340 and 350° F. Cycles may be up to 20% longer than for standard phenolic materials, and minimum pressures should be used.

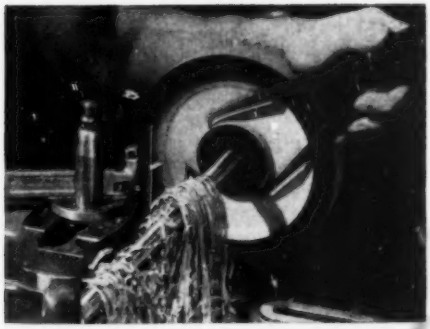
Rubber-phenolic molding compounds are ideally suited for transfer or plunger molding. They are fundamentally soft and have a long duration of flow.

Design problems of molded parts are minimized. Parts do not need as much reinforcement, excess radii, or thicker sections as do standard phenolics. But, depending on the blend, they will react more like rubber under stress and strain.

The most important reason for using rubber-phenolics is to secure impact strength at reasonable cost. Bases for air circulators made by W. W. Welch Co. are molded from General Electric Co.'s wood-flour-filled rubber-phenolic. These bases are designed to withstand accidental kicking and knocking about, as well as rough handling in shipping.



PLIERS use electrical and strength properties of rubber-phenolic



GEAR BLANK is turned to size on a standard lathe without special tools

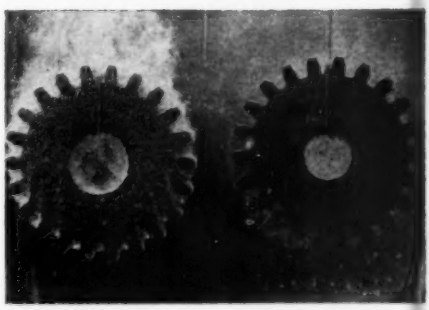
The rubber-phenolic gives them impact strength and resilience, and the material can be preformed and finished like ordinary phenolics.

Combined impact strength and chemical resistance are the reasons for using rubber-phenolics in the impellers for G. E.'s automatic dishwasher. With the conventional flock-filled phenolic compounds, breakage sometimes occurred when silverware was accidentally dropped on the impellers. Drop tests on the blades of the new impellers show that they can withstand at least five times as much impact as the former impellers.

Vibration-fatigue resistance was the chief reason why Precision Equipment Co. had the cylinder shields and handles for a portable tree saw molded of G. E.'s rubber-phenolic. The plastic eliminated machining and painting operations, and actually reduced parts' cost 75%.

Resiliency was a desired property in the design of a cable clamp for some of International Business Machines Corp.'s units. The clamp is molded from a Durez Plastics & Chemicals, Inc. compound. Compared with a metal clamp, the plastic clamp has better flexural characteristics and lighter weight.

Rubber-phenolics in harder flows take



STEEL GEAR (left) and rubber-phenolic gear are dipped in sulfuric acid with obvious result

BASE for air circulator has high impact resistance because of rubber-phenolic

to machining readily. Parts with metal inserts have been machined to special shapes without particular trouble. Most machine tools are easily adapted to machining the rubber-phenolics.

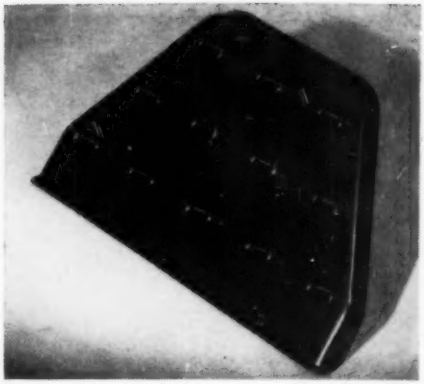
The Compo Shoe Machinery Corp. is using rubber-phenolics for their abrasion and chemical resistance. A rubber-phenolic wheel on a rotary roughing machine handles up to 3,600 pairs of soles a day. The wheel feeds the soles into the machine; by changing the hardness of the wheel, any type of soling material may be handled.

Rubber-phenolics have good electrical properties. They are used in television and radar repair pliers. Any good phenolic would have served, except that repairmen often drop pliers onto concrete or hard ground. Rubber-phenolic, transfer molded, reduced breakage 50%.

Chemical resistance is not a prime property of the rubber-phenolics. Less costly materials will do quite as well. But where impact and resilience, vibration-fatigue resistance, and good appearance are also required, rubber-phenolics have an advantage.

Neither the makers of rubber-phenolic materials nor the molders make a selling point of cost economy. The material runs 3 to 5¢ a lb. higher than similarly filled straight phenolic compounds, has a specific gravity 3 to 4% lower than conventional phenolics, and has a 10 to 20% slower cycle. But it can do a better job in some instances than straight phenolics—and, in many cases, it can be used in the same molds. In many other instances, it can do a superior job to wood, metal, ceramics, leather, and rubber; and it can produce definite economies over the original of the application. Expanded applications are expected in textile equipment, automobiles, communications, home appliances, machine parts, business machines.

To sum up: rubber-phenolics provide (1) greater impact strength; (2) improved vibration fatigue; (3) greater thermal-shock resistance; (4) no sacrifice in performance, moldability, or appearance; (5) low-cost assembly operations; (6) elimination of cracking after molding around large inserts; (7) good machinability; (8) high wear resistance; (9) good chemical resistance; and (10) adequate electrical properties.—Mod Plastics, Feb, p71

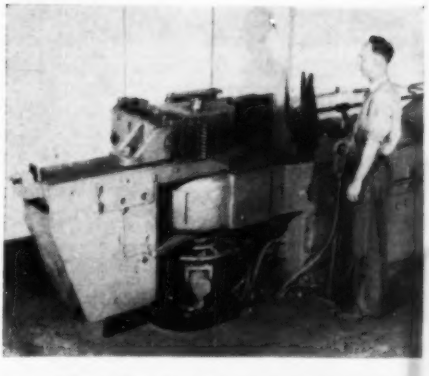


***HOLDER** for cutters prevents cutters from rattling when machine is operated*

***DISHWASHER IMPELLER** has five times impact strength of former impellers*

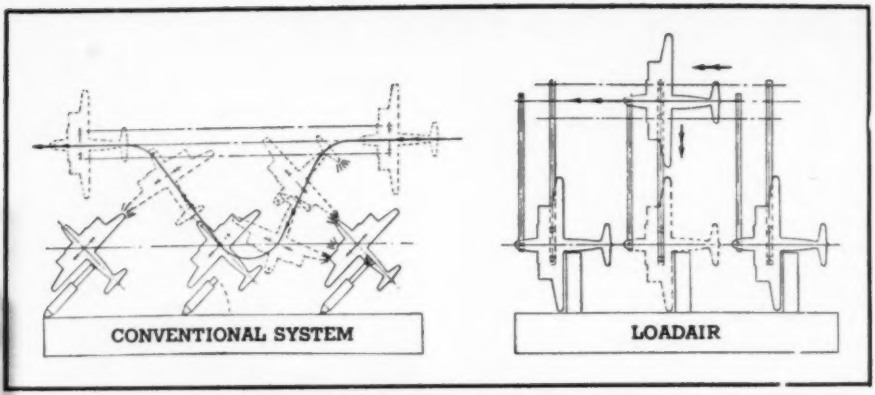
This Month's How To . . .

. . . **bend several parts** at one time is shown at Allis-Chalmers La Porte Works. The machine, made by Pines Engineering, takes ten pieces of stock. Rods are placed between grooved die and stationary pressure plate. Rotating arm (at left) holds clamp against die and then, moving counterclockwise, pulls stock past rollers on pressure plate and forces it into die grooves. Circular die moves with rotating arm. Stroke ends when arm has forced stock completely into die grooves. Arm motion is nearly 180°, but can be more for other jobs.—Am Mach, Feb 4, p100.



. . . **make close inspections** bothered City Auto Stamping Co. engineers until the company got this granite surface plate. It permits ultra-precise inspection of dimensions, tolerances, and other engineering details of metal stampings. Granite block has no seams, flaws, or soft spots. The largest block ever quarried, it measures 192x96x32 in. and weighs 50,000 lb. It rests on three rubber cushions placed between the 32-in. concrete foundation and the stone itself to prevent vibration.—Prod Eng, Feb, p200.

. . . **repair sheet metal damage** is easy with plastic metal process. Instead of tediously pounding out dents in sheet metal panels of its buses, Philadelphia Transportation Co. fills the dents with Met-L-it. Made by the R. M. Hollingshead Corp., the plastic-powdered aluminum can be applied without heat or special tools. It is waterproof, rustproof and strong. It can be applied in layers to make patches of any thickness or size. No special finishing operations are needed. PTC employs the process on all types of panel repair.—Bus Trans, Feb, p58



AUTOMATIC PLANE PARKING DEVICE

Loadair, manufactured by Whiting Corp., is an automatic method of sliding aircraft sideways from taxi ramp to airport terminal for loading and unloading. First installation is at Soledad Airport, Colombia. Loadair consists of two sets of tracks mounted practically flush with the surface of the loading ramp. Three cars roll on these tracks. Two powered dollies, properly spaced, accommodate the aircraft's main gear; a smaller, free-moving car carries the nose wheel. Plane is taxied onto the dollies and moved sideways from ramp to airport terminal. Advantages are: greatly expanded utilization of airport loading space and speedy loading and unloading of passengers and cargo.—Aviation Wk, Jan 28, p59

Ultrasonics Test Tires

Ultrasonic tester has been developed in England to test aircraft and automotive vehicle tires. Dunlop Rubber Co., Ltd., and General Electric Co., Ltd., cooperated in the development.

The tire being tested is lowered into a tank of water, which provides a good transmission path between ultrasonic transmitter and receiver. As the tire is revolved, any air films caused by imperfect bonding between rubber and fabric can be detected by reflection of ultrasonic waves. Faults as small as $\frac{3}{32}$ x $\frac{3}{32}$ in. can be detected.—Electronics, Feb, p214

Tracklaying Shuttle Car

Lower ground pressures, greater maneuverability, greater carrying capacity, faster unloading, simplified drive, and better roadway conditions were objectives when General Electric Co. set out to design a new tracklaying shuttle car.

Each track of the new car is separately driven by an electric motor. Each motor is fitted with a hydraulic steering brake. By varying the braking of the track, turns of varying radii can be made.

Each track carriage is spring-mounted on one end, producing a three-point suspension. This reduces breakdown of the roadbed.

The extra-wide conveyor permits more coal to be carried in the front, or discharge, end of the car. And the wide conveyor shortens the time for unloading.

Initial field experience shows that the car fits a variety of mining operations and is a highly practical vehicle.—Coal Age, Feb, p108

Coal Shortage Hits Europe

The coal shortage cuts deeply into Western Europe's dollar supply while Britain and Germany face problems in increasing production

WESTERN EUROPE'S biggest economic problem is coal. Shortages are upsetting European dollar balances and threatening to choke Atlantic rearmament. It is up to Britain and West Germany, who produce 76% of Europe's coal between them, to do something about the shortage in a hurry.

There is plenty of coal in the ground. But digging it is the problem. And Britain and Germany each have special roadblocks to remove before they can boost output.

For Britain, the trouble is mainly manpower. Britons just do not want to work in the mines. There are many proposals to get the men to work in the mines. The *London Economist*, for instance, suggested that Britain might jack coal prices, cutting consumption and leaving more for export, then pass on the proceeds to miners in the form of higher pay.

For West Germany, the problem is primarily worn-out equipment. Right now Germans are talking about a huge, $875-million investment program to modernize the mines. If, say the World Bank or others were to step in with a big loan, the program might soon start.

It is clear that something has to be done. Last year, Western Europe consumed 486-million (metric) tons of coal, produced 451-million tons. The deficit was covered by imports from the U. S. (25-million tons) and Poland. Now Western Europe is buying U. S. coal at a rate of 35-million tons yearly, at a cost of at least $700-million. That could use up over 75% of all U. S. economic aid earmarked for Europe.

If Europe's gross industrial production increases over the next 5 years as planned, then the deficit will continue. In 1956, it will still be 25- to 35-million tons.

Britain Needs Men

Britain now produces nearly half Europe's total coal output—225-million tons last year. But out of that total it exported only 12-million tons, compared with exports of 46-million tons in 1938. That is the gap that forced Europeans to buy U. S. coal. Actually, British production last year about equaled 1938. But British consumption is around 25-million tons larger.

The reason for the trouble is that the mineworker force is too small, too elderly; there is no unemployed labor reserve to fill in the gaps.

There are plenty of remedies under discussion to boost coal output. Some of them are:

- Britain could make more efficient use of the existing labor force.
- More pay would help. Another pound a week might attract labor.
- Miners could be imported—especially from Italy. So far, British miners have flatly refused to accept Italians.

The best expected from the big effort under way to increase output this year is another 8-million tons. That is about equal to the present domestic shortage. So it would easily be absorbed without raising exports to Europe—unless drastic action is taken.

Most economists believe the only short-run way to boost exports is to cut British consumption. First necessity is to make coal more expensive, then do the same for electricity. Both are still cheap compared with the general price level. Combined with an

allocation scheme, the higher price might cut British coal use 10-million tons, which with increased production would let exports rise to 30-million tons. That, plus a small increase in coal output from West Germany and France, might do away with Europe's needs for expensive U. S. imports.

Germany Needs Money

Last year, West Germans dug 118.6-million tons of coal, compared with 137.6-million in 1937. Production targets of 126-million tons this year and 150-million in 1956 have been mapped out. Germans think that neither target is out of reach; coal production is progressing rapidly. But it will take more miners, more new machinery.

There is plenty of manpower. Bonn has made mining more attractive by letting miners share in the profits, cutting taxes on overtime work. One big need is housing. A plan has been worked out to finance new construction by putting a levy on every ton of coal mined.

Biggest problem, though, is to replace worn-out equipment. It is estimated that $875-million will have to be spent between now and 1956. Of this, Germans say they can put 340-million.

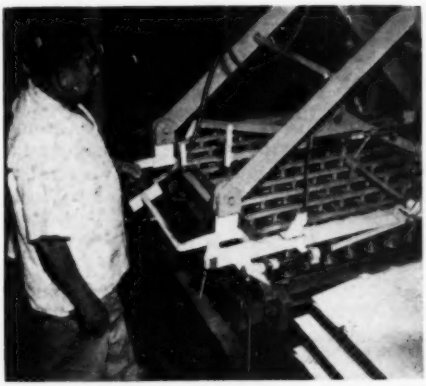
The German capital market is nervous, afraid to invest in an industry that might be fair game for nationalization in case Kurt Schumacher's Socialist party were to get in power. So new coal money must come from outside

As for France, third largest European producer, it can boost a solid postwar production record. French 1951 output hit 55-million tons, up 10-million over 1937. There are plans to hit 61.6-million tons by 1956.

But even remarkable production accomplishments in France and the smaller producers (Belgium, the Netherlands, and the Saar) can only make a dent in the over-all shortage. Major improvement must come from London and Bonn.—Business Wk, Feb 2, p129

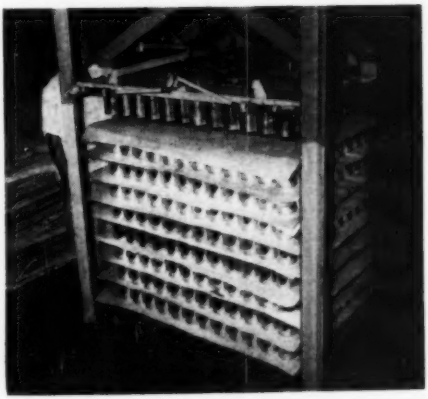
Filled-Can Palletizer

Cans Are Lifted . . .

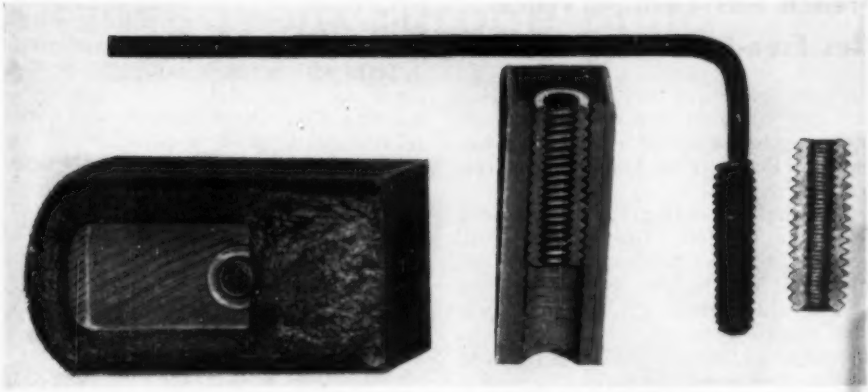


. . . by vacuum cups supported by suction head of Hawaiian Canneries' palletizer. Electric hoist raises head with its load of filled cans. Operator manually moves assembly along overhead trolley over the pallet where . . .

Load Is Lowered . . .



. . . gently onto pallet. Suction is released, cans are deposited, and head is swung back for another load. Pallet is loaded with 2,160 No. 1 cans. Similar unit depalletizes cans. Equipment will be made by Emhart Mfg. Co.—Food Eng, Feb, p74



PICKER HOLDER PERMITS PARALLEL ADJUSTMENTS

Device, offered by Hardwood Mfg. Co., eliminates putting screws through the picker and into the stick. It consists of a half-round, hollow setscrew, threaded inside and outside, that is screwed into a threaded hole in the picker stick. Rubber or leather picker goes on the stick next, in the normal manner. Then an Allen-type setscrew is screwed into the first fitting. In going in, the male fitting cuts its own threads in the picker. When the male fitting is all the way in, the picker can be adjusted up or down to make it parallel.—Textile World, Feb, p175

Basic Five-Step Program Saves Water, Cuts Costs

If saving water is important in your plant operation, consider this five-step method that saved for Westinghouse Electric Corp.:

1. Find out where the water is going by running a plant survey. Install meters for departments that are big users.

2. Establish a program to make everybody water-conscious. Post signs, get workers looking for leaks.

3. Put in self-contained regulating valves, automatic shutoffs, recirculating pumps.

4. Install cooling towers to allow wide reuse of water in various plant services. This step involves heavy expense and is usually applicable only to large plants.

5. Set up a policing policy. Keep checking regularly to keep good water habits good.

Results at Westinghouse were excellent. In spite of a 36% increase in water rates, the 1950 bill was 5% under that in 1947.—Power, Jan, p92

Mobile Preparation Plants

Crushing and truck-loading plants on rubber tires operating in the pits at the loading shovels are some of the features of Marshall Mining Co.'s stripping operation. The 30-in.-thick coal seam is free of partings, and the mined product carries about 7% ash.

A permanent tipple is not used. Instead, highway trucks are loaded in the pits. Portable crushing plants made by Universal Engineering Corp. process the coal. All output is shipped by truck to steel mills, electric power generating stations, and other plants in the vicinity. —Coal Age, Jan, p104

French Gas Turbine Truck Has Free-Piston Engines

Designs for a gas-turbine truck were recently revealed before members of the French Society of Automotive Engineers. Power plant features two free-piston engines.

The engines, each of 120 hp., feed a two-stage turbine. Operating at full load gives a gas pressure of 56.9 psi. effective. The turbine has two power wheels and a brake turbine wheel. At road speeds between 11 and 50 mph., an output of more than 220 hp. is maintained. Low-grade fuels are burned.

Declutching the two-speed transmission requires slowing the turbine's 30,000 rpm. That is where the turbine brake wheel comes in. This wheel also provides an effective brake on long downgrades. In some cases friction braking may not be needed at all.—Auto Ind, Feb 15, p52

How To Store Muriatic Acid

Mild-steel tanks can be made to store muriatic, or hydrochloric, acid without any danger of attack. The trick is to coat the interior of the tank with polyethylene (McG-H Digest, Dec '51, p58).

The tank surface is sandblasted, then roughened to improve the mechanical bond between metal and plastic. A flame-spraying gun pre-heats the tank and applies the polyethylene. Several passes are needed for a 0.05-in. coating. Speed is comparable to paint spraying.

Tests with a spark gap tester should show no porosity. At Southern Lead Burning Co., where the job was done, service tests of 6 weeks showed no corrosion of the steel plate.—Weld Eng, Jan, p63

Universal Testing Machine

New hydraulic testing machine can make tests that normally might require six or seven different testing machines. It can measure tensile or compressive strengths, Brinell or Rockwell hardness, and resilience of metal sheets, fabrics, wire, or larger metal shapes.

The machine, built by Etablissements G. Peter & Fils, Malakoff, France, has either four or five telescoping pistons, depending on machine size. Each piston can be employed in two ranges of force. Readings are made on a dynometric unit activated by oil pressure built up by the testing piston.

Machine sizes are 3, 15, and 50 metric tons. A number of machines are already in use in French manufacturing plants.—Mach, Dec 29, p1998

Checks Metal Surfaces

New test detects oils, greases, and fats on metal surfaces. It will be useful in the plating industry to determine when cleaning solutions have been exhausted and to evaluate relative efficiencies of cleaners.

The panel to be tested is sprayed for ½ min. with distilled water from an atomizer under a 9-psi. air pressure. If the water forms a film, the panel is clean. Droplets indicate soil.

The method, developed at Columbia University, has proved ten times as sensitive as conventional testing. Another valuable advantage is its simplicity.—Chem Wk, Jan 19, p32

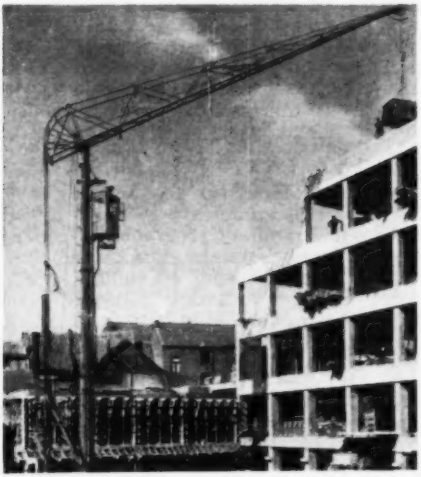
Yours for the Asking

Valuable business and technical information is brought you in the department, "Production Ideas from Manufacturers' Catalogs". These catalogs are free—will be sent gladly by manufacturers to people who need them in their businesses. Just fill out the coupon on page 72 and send it to us. And for other catalogs, see pages 6, 16, 17, 75, 77, and second cover.

Cranes Help Europe Build

HORIZONTAL JIB on English tower crane makes it possible to place construction materials over wide area of project.

HUGE GERMAN CRANE hoists to 206 ft. Tremendous 98-ft. jib angles to almost horizontal (with a 4,400-lb. capacity).



IN BELGIUM, rotary tower crane is built of tubular sections. Crane has variable-height cab, 115-ft. lift, and 66-ft. reach.

CLAMPED to scaffolding, British gas engine-driven winch and jib speed work on small jobs.—Const Meth & Equip, Feb, p56

TECHNICAL SHORTS

Diesel for Racing—Cummins Engine Co. has designed a lightweight, high-speed diesel engine for competition in the 500-mi. Indianapolis Race classic. Engine will have 401-cu. in. displacement, 5-in. stroke, 4⅛-in. bore, and a speed of 4,000 rpm.—Auto Ind, Feb 1, p22

Fantastic Power—Last year saw 370-billion kw.-hr. of electrical energy generated in the U. S. That was about 13% more than in 1950 and 2¼ times as much as in 1941. Growth in fuel power is outstripping that of hydro generation.—Elec World, Jan 28, p146

Cuts Corrosion—Heat- and acid-resistant porcelain enamels, bonded to exposed surfaces on coal-handling chutes and screw conveyors, improve flow of coal by reducing friction and increase life of parts. Enamel should have medium hardness to balance abrasion resistance with impact strength.—Coal Age, Feb, p118

CIRCLE-CUTTING DEVICE SAVES TIME

Average reduction of 90% in man-hours is the saving reported for a circle-cutting fixture for bandsaws designed by an employee of Texas Engrg. & Mfg. Co., Inc. Fixture consists of an auxiliary table clamped to the saw table. Two scales scribed on the auxiliary table at right angles serve to position the board to be cut and the sharp pin on which it pivots. Pin acts as radius gage.—Factory, Feb, p114

Takes High Heat—New high-strength at high-heat polyester laminating resin is under test at Wright Air Development Center. Laminates made with the resin and glass fabric retain good flexural strength—40,000 to 47,000 psi.—when exposed 200 hr. at 300° F.—Aviation Wk, Jan 14, p22

Counteracts Shrinkage — Making cast forming dies for aircraft parts requires close control of shrinkage and metal solidification. Northrop Aircraft, Inc., gets this close control by making patterns with expansible plasters to compensate for metal shrinkage.—Iron Age, Dec 20, p110

Newsprint Outlook—Prospect is slight easing in the present shortage. Greater production will meet more than 97% of world's demand this year. Shortage will be up to 8% in some areas.—Paper Ind, Jan, p1156

Builds-up Complex Parts—U. S. Navy Bureau of Ordnance has developed a spray-forming technique for fabricating large, complex parts of high-melting-point metals. First, metal is sprayed onto a core of the desired shape. Then, sprayed deposit is sintered to form a dense, strong, metal part.—Marine Eng, Feb, p84

Ahead in Enameling—Recently forecast for porcelain enameling in years ahead were: elimination of ground coats, reduction in enamel weight, lower enameling temperatures, better enameling steels, more efficient furnaces, improved continuous spraying, elimination of plant milling departments.—Ceramic Ind, Jan, p67

More Cold Rubber—Phillips Chemical Co. has announced equipment to speed up cold polymerization of synthetic rubber. It is a tube bundle that provides extra heat-transfer surface. Result: batch time cut from 13 hr. to as little as 6 hr.—Chem Eng, Jan, p220

We Were Wrong—In Nov. '51, p33, we said that the first Australian-made fork trucks were going into production in Sydney. But now we find that J. A. Lawton & Sons, Ltd., Adelaide, has been manufacturing fork trucks since 1943. Good luck to them, and may they make many more.

How To Save Snow Shoveling—Puget Sound Power & Light Co. solved the problem of having to dig poles out of snow along its right-of-way. Poles are stood on end, guyed, and snubbed together so individual poles can be singled out and lowered without dropping the whole stack.—Elec West, Dec, p80

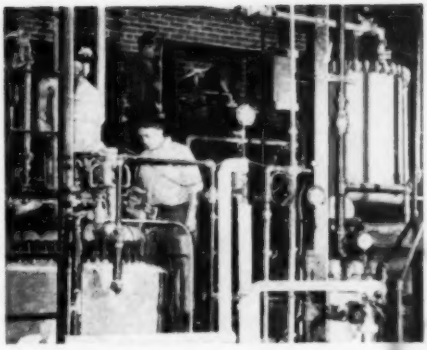
Reduce Neps—Neps in cotton can be controlled by careful machine adjustments considering factors that affect neps. Excessive beating should be avoided. Card lickerin and cylinder should approach same surface speed. Too much drafting is detrimental.—Textile World, Feb, p138

Everything Automatic—Even outboard motorboats can now be steered automatically. A relay-type automatic steering system has direction-sensing element with phototube. Setting phototube according to travel direction permits sunlight to keep boat on course.—Electronics, Jan, p172

Cheap Fuel—Sewer gas from an adjoining sewage disposal plant heats municipal garage in Austin, Minn. Heating system uses a stainless-steel combustion chamber, designed by Dravo Corp., to prevent rapid corrosion from sulfuric acid in gas.—Business Wk, Jan 26, p71

Puts in the Mustard—Recently patented sausage-forming machine introduces a core of mustard, relish, or the like into center of sausage as it is being formed. Two concentric tubes feed meat and condiment at same time.—Food Eng, Feb, p167

Spark Plug Lasts Longer—A 360° circle of fire from round center electrode in new spark plug improves combustion. It is said to last four to seven times longer than many plugs with individual side electrodes.—Prod Eng, Feb, p7



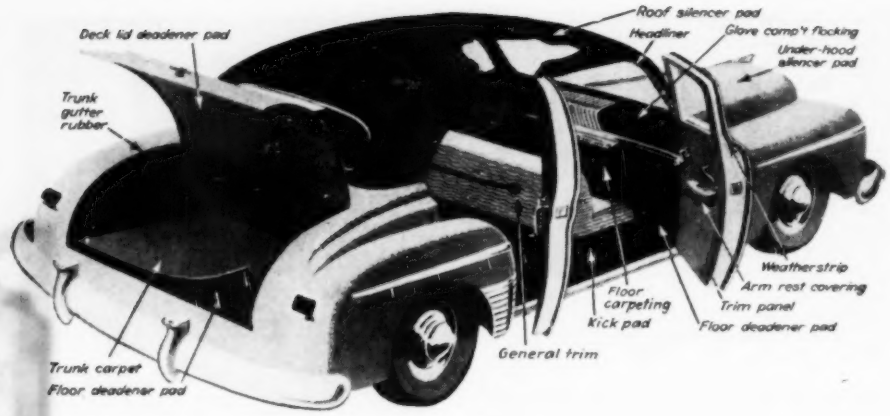
SOLVENT EXTRACTS ACID

In making cyanoacetic acid, Kay-Fries Chemicals, Inc., faced trouble in separating acid from water solution. So it developed a solvent extraction process using methyl isobutyl ketone or mesityl oxide, and then improved the process by steam-distilling the solvent and crystallizing acid from the water. Result is white crystals, 98% pure and easy to handle.—Chem Wk, Feb 9, p34

Expoxy Protects Aluminum—When acids in cream threatened to ruin the aluminum container in a cream whipping unit, Kidde Mfg. Co., Inc., coated the container interior with an expoxy resin. Container is filled with resin, and after a short interval the resin is poured out. Resin that adheres to container walls forms hard coating.—Mod Plastics, Feb, p160.

Salvage Crankcases — Resurfacing of scored bores in cast-iron crankcases with a nickel-alloy weld metal makes it possible for Autocar Co. to report 100% salvage. Weldor deposits bead-thick layer of metal onto bores. Deposit is machined down to original dimensions. —Const Meth & Equip, Feb, p72

Wood-waste Firing—Boiler tests at University of New Hampshire showed (1) efficiencies of 63.2 and 68.2% with good combustion conditions; (2) system is clean, makes little smoke; (3) cost is likely to be competitive with coal or oil if wood does not have to be hauled.—Power, Feb, p100



Rubber Adhesives in Industry

Industrial adhesives are to the manufacturer what plain glue is to the housewife—a way to make cheap, quick, good joints

THE MODERN AUTOMOBILE, with all its steel construction, would be hard to assemble without adhesives. It would be noisier, and it would cost more. And it is just one of the many modern products that benefit from the unique design possibilities of adhesives.

Rubber adhesives have an outstanding property that sets them aside from others—they produce non-rigid bonds. They flex and stretch under stress. Also, they can support a moderate load immediately after the joint is made.

Rubber adhesives, along with other adhesives, are inconspicuous compared to other fastening methods, permit improved styling and appearance, give continuous contact between mating surfaces and so distribute the load over the whole joint area. Adhesives also can seal the joint against leakage of air, dust, or liquids.

When designing for adhesive joints, keep these points in mind:

1. Allow for maximum possible contact area in joints. As adhesives have less unit strength than metal fastenings, greater area is needed to support the load.

2. Put the maximum amount of adhesive film to work. Tensile and shear bonds are strongest types, cleavage bond is next, peelback bond is weakest as it utilizes only the edge of the adhesive film.

3. Investigate adhesive properties thoroughly and consult manufacturers when selecting an adhesive. Service requirements, production facilities, assembly sequence, time schedule, and shop conditions affect the choice.

Proper application is necessary for good joints. Surfaces must be clean as adhesives will not adhere to wet, oily, or dirty surfaces. Any coating may have to be removed; even though the adhesive may adhere well to the coating, it may attack and lift the

coating and thus produce a poor joint.

Adhesives may be applied over mating surfaces by brush, spray, roll coater, trigger-operated pressure oil can, pressure-fed flow gun, knife spreader, stamp pad, silk screen, and printing machinery.

Brushing and spraying are most common means. Several types of roll coaters for sheet stock are in use. Pads are particularly useful on parts having unusual contours, while the silk screen is used where only certain areas of surface are to be covered with adhesive. Printing machinery also can apply adhesives in almost any desired pattern.

Once it is decided how the adhesive is to be applied, the technique for making the bond must be chosen. Common techniques are:

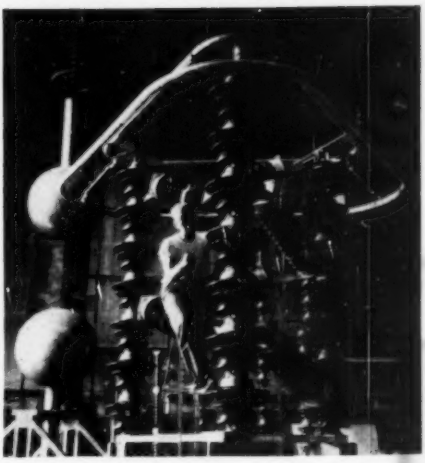
Wet Bonds—Adhesive is applied to one surface (the least porous), and the other is brought into contact with it. Lightweight insulating materials and fabrics are usually bonded this way.

Tacky Bonds—Adhesive is applied to one or both surfaces and allowed to dry somewhat before the surfaces are joined.

Reactivated Bonds—These bonds are useful where both surfaces are impervious to passage of solvent or are large in area. Adhesive-coated surfaces are joined and the assembly is heated to soften the films, or the adhesive films may be dampened with solvent and the parts then mated.

Pressure-Sensitive Bonds—Adhesive films stay tacky for long periods. Bond is made by joining and pressing surfaces together.

Curing Bonds—Some adhesives require an accelerator to effect the cure necessary to develop strength.—Prod Eng, Feb, p130



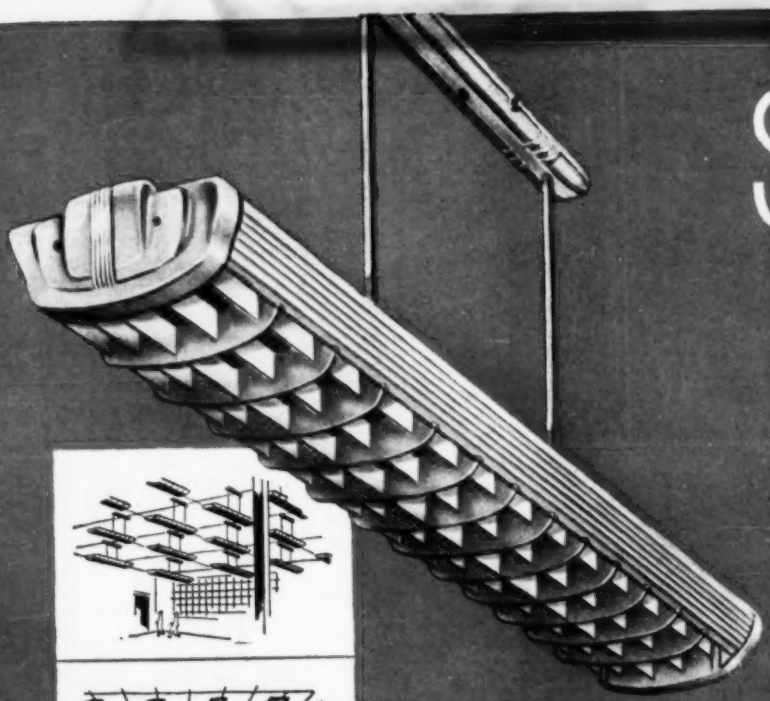
NEW-TYPE LIGHTNING ARRESTER

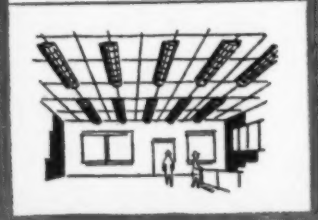
Three-legged, 195-kv. lightning arrester is under test by Westinghouse Electric Corp. Unique spiral design reduces height of arrester, which ordinarily would require porcelain-encased elements towering 20 ft. or more in the air. Unit can be mounted on wheels for greater usefulness.—Elec World, Jan 21, p48

Combines Light, Acoustics

Illumination and sound conditioning form one package in a new system developed by Curtis Lighting, Inc. It uses bare fluorescent lamps, concealed from normal viewing angles by vertical shielding. This shielding is so made that it doubles in service as an acoustical agent, cutting down noise.

Installation is simple. Parallel wire channels are strung along the ceiling, 96 in. apart; then the fluorescent tubes are mounted between them. Because lamps are bare, some kind of shielding is needed to ease the glare. So Curtis simply taks 1-ft.-high panels and hooks them to the wire channels in a square pattern. Panels are made of acoustical tile for soundproofing benefits.—Business Wk, Feb 16, p86





STYRON

solves another production problem!

The manufacturer of this fluorescent lighting fixture chose Styron (Dow polystyrene) for his product. A material was needed that would permit a much larger installation than would be possible with heavier materials. Styron, light in weight but with excellent dimensional stability, filled this requirement.

Styron brought other outstanding advantages. Its special white colors provided good light transmission and diffusion. Its ease of moldability allowed the manufacturer to mold large portions of the assembly in one piece, reducing costly assembling operations.

This outstanding thermoplastic used for applications from wall tiles to radios may be the right material to cut costs and improve the appearance of your product. Contact your nearest sales representative or write Dow direct for more details about Styron.

Fill your chemical requirements from these DOW products!

alkalies

Dow alkalies serve many varied industries. Caustic soda is used to manufacture soaps, synthetic detergents and cleaning compounds; in refining vegetable oils; in manufacturing rayon and other textiles, paper and petroleum products and in chemical processing. Other Dow chemicals of alkaline nature include caustic potash and Sodium Orthosilicate Cleaning Compound.

dowicide® products

Today, materials in process can be guarded against attacks of mold and bacteria by the use of Dowicide industrial germicides and fungicides. These preservatives protect materials against microorganism attacks in processing paper, textiles, leather, lumber, adhesives, petroleum and disinfectants.

agricultural chemicals

A recognized leader in agricultural chemicals, Dow manufactures both basic ingredients and finished products that help farmers raise more and better crops and livestock. The Dow line includes such products as: weed and grass killers, insecticides, fungicides, soil and grain fumigants, plant growth regulators, veterinary chemicals and wood preservatives.

glycols

These versatile Dow chemicals are in great demand in many industries. Here are a few of the jobs they are now doing: a moistening agent in foods and tobacco; a plasticizer for films; a freezing point depressant in automotive and industrial antifreezes; a solvent and carrier in printing inks; a coupling agent in textile soaps, as well as in various cosmetic preparations.

There's a Dow Sales representative near you. Contact him for information about these products and more than 600 other chemicals which Dow supplies to industry or write to Dept. EX-45.

DOW CHEMICAL INTERNATIONAL LIMITED
DOW CHEMICAL INTER-AMERICAN LIMITED
Midland, Michigan, U. S. A.

CABLE: Dowchemco

DOW
CHEMICALS

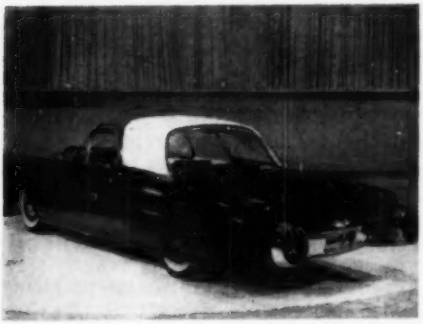
1952: New Styles, New Engines

- Buick raises engine horsepower, has hydraulic power steering
- Cadillac highest in power output with 190-hp. V-8 engine
- De Soto features 160-hp. V-8 engine similar to Chrysler V-8
- Ford shows completely new body style and car of the future

BUICK mechanical and style changes include power steering, increased engine output, larger luggage compartment, and trim revisions.—Prod Eng, Feb, p149

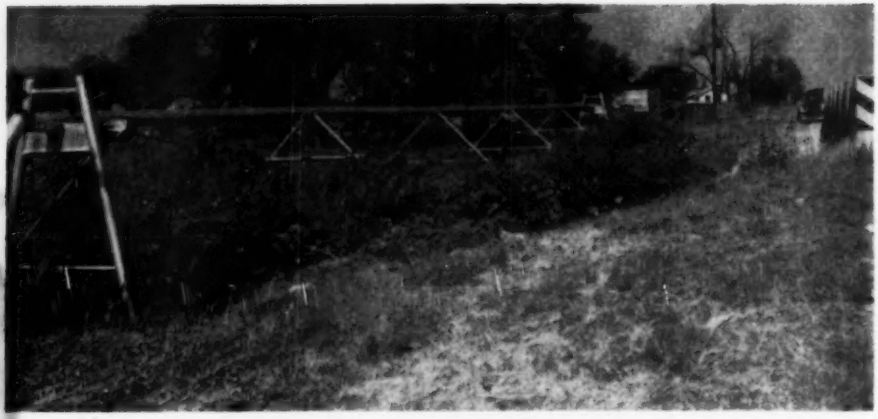
CADILLAC engine output of 190 hp. comes from complete redesign of intake and exhaust systems, and 4-barrel carburetor.—Auto Ind, Feb 1, p33

DE SOTO for 1952 features brand new 160-hp. V-8 engine patterned after Chrysler's 180-hp. engine (McG-H Digest, Apr '51, p25).—Auto Ind, Feb 15, p39



FORD's experimental car has ball-joint front suspension, minimum unsprung weight on rear suspension, and new torque converter.—Am Auto, Mar, p38

1952 FORD has redesigned body. Windows are larger. At the rear, fuel filler is centrally located. Two engines are available.——Am Auto, Mar, p39



BRIDGE PROTECTS PIPE LINE FROM FLOODS

Rock bottom in stream subject to flash floods caused bridging of stream with pipe line. The 8-in. line, from usual trenches on stream banks, is raised by welded miters and supported on two A-frames 125 ft. apart and 8 ft. high. Each A-frame has bearing yoke serving as cradle for pipe. Reinforcing sleeve with cable-support plate is welded to pipe at each A-frame. Two cables run between sleeves and are supported at 25-ft. intervals by triangular braces. Tightening cables reinforces structure and keeps pipe on a straight line.—Weld Eng, Feb, p22

Detects Broken Wheels

The Ventura County Railway has installed equipment that detects defective wheels on moving trains. It consists of two units; one checks for broken flanges and loose wheels, the other checks for broken treads. A bell and light signal actuated by the detector indicate a defective wheel.

The broken-flange detector consists of a series of spring steel fingers at right angles to the rail. Near the end of each finger is an insulated steel pad. When a normal wheel runs over the unit, it depresses the fingers. A broken flange allows the fingers to contact the wheel completing the circuit to the indicators.

The broken-tread detector consists of a detector rail placed slightly below the top of the other rails. A wheel, with a broken tread, passes over this detector. If the wheel drops $\frac{1}{16}$ in., the circuit is completed to the indicators.—Rail Sig & Com, Feb, p117

Heat When, Where Wanted

Faced with a peculiar set of problems in heating its plant—dust, drafts, hot kilns, and fast-changing temperatures—Pomona Tile Mfg. Co. decided on radiant heat. A total of 23 gas-fired unit heaters were installed in three widely separated areas. Some are suspended from overhead. Others, in the coldest location, are floor mounted.

The system permits spot heating of any size area. In all cases employees are comfortable. By proper location and spacing of the unit heaters, heat energy was concentrated only where needed. Everything within range is at approximately the same temperature.—Factory, Feb, p94

Pickling-Acid Inhibitors

Saving of materials, smoother metal surfaces at lower cost, uniform pickling, no over-pickling are only a few of the advantages

STEEL AND ACID are in short supply. If the porcelain enameler uses inhibitors in pickling acids, he helps save both materials.

With inhibitors, the same amount of acid will clean a greater tonnage of metal. Thus the acid bath may be renewed less frequently, thereby reducing labor costs, quantity of spent-liquor disposal, risks in handling the acid, and acid storage space needed.

Then add these advantages:

1. Neither pitting nor burning of the work by the acid.
2. No carbon deposits formed on the work.
3. Less tendency for the work to rust after pickling.
4. Uniform pickle produced under varying conditions.
5. No acid damage to surfaces of machined work.
6. Rapid production of uniformly smooth, bright, clean surfaces.
7. No over-pickling.
8. Wider working temperature allowable.
9. No corrosive pickle-room fumes.
10. Less hydrogen absorption by the metal.

American enamelers have long neglected the use of inhibitors for two reasons. In the past when the single-coat gray mottled wear formed most of the production of holloware plants, inhibitors could not be used as they counteracted formation of the "granite". Also, most enamelers once believed that a deep etch was necessary for good adherence—and a deep etch is precisely what inhibitors prevent.

The action of inhibitors is not thoroughly understood; several theories have been advanced. But their general effect is to reduce the reaction between acid and steel.

Good inhibitors have satisfactory stopping action and stability against pickling acids, they do not increase pickling time to any great extent, and they give clean surfaces without hindering subsequent workability. They include the following:

- Chemical compounds and mixtures, such as hydrocarbons and sulfo acids and hydrocarbons.
- Three-membered heterocycles and

WEAVE CUTS WIND RESISTANCE

Dramatic store sign identifies California food store. Sign is 49x42 ft. and stands 52 ft. above ground. It is made of 18-gage steel bands 18 in. wide and 6 ft. long. Bands are woven so that ends join at steel posts. The large sign "breathes" because of the open areas of the woven pattern. Thus sign has little wind resistance.—Am Builder, Jan, p280

five-membered heterocycles with one to three hetero atoms.

• Products from mineral oils, fats, and carbohydrates.

The number of inhibitors that can be used is almost endless. Just a few are starch, gelatin, glycerine, anthracene, creosote, sulfonic acid, fatty acids, sulfur compounds (such as CS_2 derivatives), aryl-thiourea aldehyde, arsenic, sodium chloride, cellulose pulp waste, and formaldehyde. Commercial inhibitors are offered under a variety of trade names.—Ceramic Ind, Feb, p61

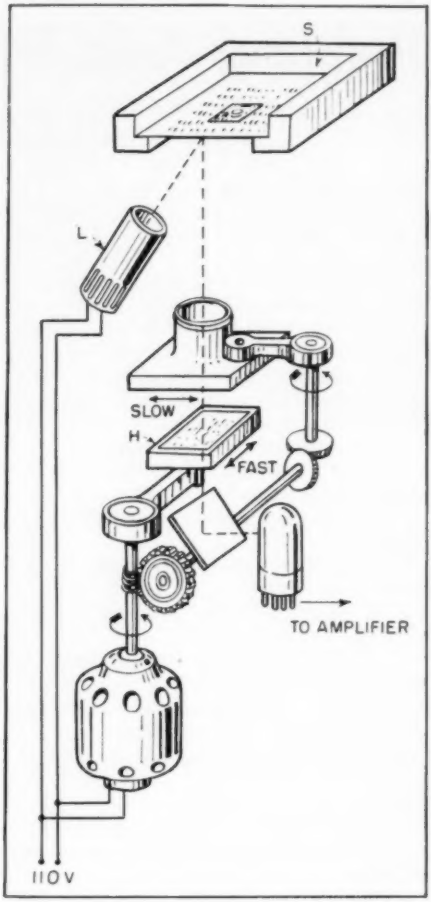
Direct Steaming Reduces Freight-Yard Smoke Problem

Air pollution from railroad yards can be a serious problem in large cities. But Canadian Pacific Railway Co. has eliminated this nuisance at its new freight terminal yard in Montreal.

Much of the unwanted smoke comes from relighting fires in cold engines; the cause is poor combustion. So Canadian Pacific installed direct steaming equipment that charges locomotives with steam and water at the correct temperature and pressure, thereby eliminating smoke from cold fireboxes.

Steam is generated in three two-drum boilers with a capacity of 35,000 lb. per hr. at 250 psi. and 550° F. total temperature. Auxiliary equipment includes air heaters, superheaters, and steam-jet vacuum ash system.

When a locomotive is ready for service, coal is put on the grates and necessary connections are made with steaming equipment. Steam is bled into the locomotive boiler slowly so it heats uniformly. Then water is fed in by the injector of the direct-steaming booster. Pressure, temperature, and water level are brought up to normal values. An oil torch lights the coal in the grate, and a clean fire starts in a few minutes.—Power, Feb, p82

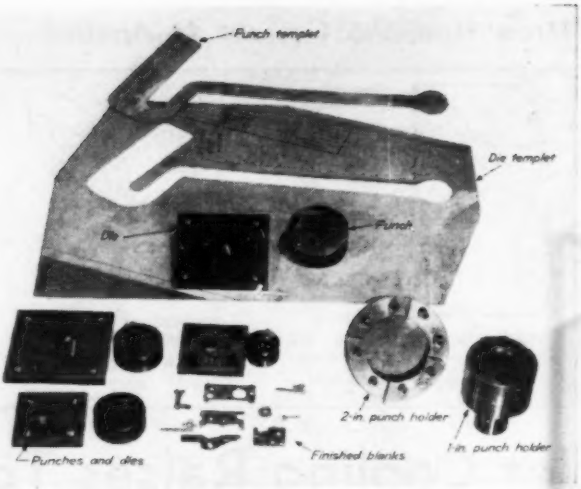


SELECTS PAPER MONEY

This device extends usefulness of automatic vending and change-making equipment by handling paper money. Negative of bill is put in holder H. When an actual bill is placed in slot S, lamp L illuminates copy and projects image upon the negative. Oscillating lens and negative permit periodic occlusion of light to reach amplifier, which with detector, relay, and phototube energizes appropriate circuits to make change. U. S. National Bureau of Standards developed the unit.—Electronics, Feb, p136

CHEAP DIE SETS MAKE PARTS FAST

Small-lot production, as in making 100 or more units of a new design for testing, is cheap and fast with these dies. They are made by bandsaw and pantograph milling machine. Blueprint is pasted on aluminum sheet, and templets are sawed to shape. Punch, die, and stripper plate are milled to shape by using templets on pantograph miller. Punching is done in hand press.—Am Mach, Feb 4, p108



How Much Light To Use Depends on Job Being Done

Three classifications are recommended for general lighting purposes in manufacturing or processing areas: (1) 30-footcandle class (between 20 and 40 footcandles), (2) 50-footcandle class (40 to 60), and (3) 100-footcandle class for higher lighting levels.

1. 30 footcandles—Use for less precise manufacturing operations, handling of bulk material, and processes requiring intermittent observation. This lighting level represents minimum and is applicable to foundries, forge shops, machine shops that rough out castings, and certain textile mills as cotton warping, silk winding, and woolen weaving on light goods.

2. 50 footcandles—Use in manufacturing areas where metal parts are machined and assembled, blueprints read, cotton or wool woven on medium-dark goods, and inspections made.

3. 100 footcandles—Use for high-speed production or highly skilled work. Such work includes small part assembly, highly accurate machining, buffing and polishing of surfaces where finish is critical, and textile operations such as cotton grading and drawing-in by hand.—Elec C&M, Jan, p88

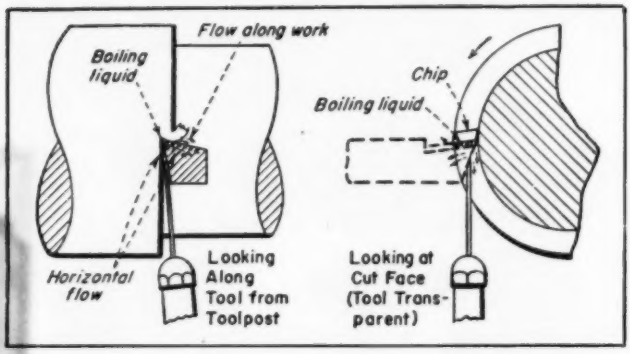
Air Starves Oil Fires

New method of fire fighting developed by Socony-Vacuum Oil Co. controls or completely extinguishes tank fires of low flash-point liquids. In one test, an open storage tank of burning kerosene was put out in 5 sec.

The method injects air below the liquid level in the tank. The air and entrained liquid rise and displace heated oil on the surface, which otherwise would vaporize to support and extend the combustion.

Burning crude oil with its gasoline fraction cannot be completely extinguished by injecting air. But the turbulence reduces the fire to a low level so mechanical foam can be applied manually at the tank edge.—Oil & Gas J, Dec 20, p182

Here's How the Coolant Is Applied



***SMALL JET** directs the cutting fluid up under the cutting edge of tool into space between side-relief face of tool and rotating work. High velocity and small jets are required to get desired penetration to edge.*

Jet Cooling Raises Tool Life

Tremendous increases in cutting-tool life, more uniform edge wear, better finish on work surfaces are a few of new method's advantages

SIX MONTHS ago we brought you the first news of a cooling method to give a spectacular increase in cutting-tool life (McG-H Digest, Oct '51, p36). We now can reveal full details of this unusual technique.

The principle of the method is simple—just direct the coolant upward under the cutting edge of the tool. Here are the advantages:

1. Lubrication of the cutting edge appears to be established.

2. Tool life, at the same normal cutting speed, is increased 6 to 12 times on high-speed-steel tools, 3 to 5 on carbide tools.

3. Tool life, at higher speeds, may be increased much more—by 20 times at double the normal speed.

4. Cutting speed may be doubled for the same tool life at normal speed, more for higher speeds.

5. Work finish is improved; comparative results are 40 to 60 micro-inches with new cooling method, 150 to 200 with conventional cooling techniques.

6. Cooling is better and less liquid is circulated.

7. Equipment is simple; it supplements the old system, which is retained to quench the vapor.

8. New method should be applicable to all turning, facing, boring, gear cutting, milling. Some skill is required to place coolant jets.

Developer of the method is Gulf Research & Development Co., part of Gulf Oil Corp. The equipment will be made by Thompson Products, Inc.

Research was directed to this problem: if a cutting fluid is to be of any value in lubricating as well as in cooling the cutting edge of a tool, it must reach the cutting edge. In ordinary application, the fluid falls on the chip and exposed tool shank, thereby cooling the edge through the chip and along the tool shank. It never gets to the cutting edge.

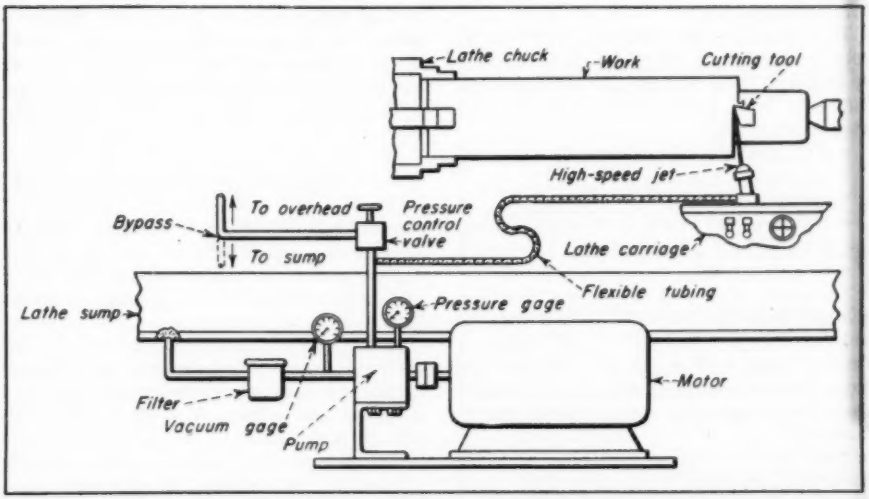
So in the new method small high-

Tool Life with Various Materials, Tools, Speeds

METHOD	MATERIAL	TOOL MATERIAL	SPEED, SFPM	DEPTH IN.	FEED, IN.	TOOL LIFE, MIN. (AVG.)
Conventional	SAE-1020	18-4-1 HSS	212	0.125	0.033	1.02
New	SAE-1020	18-4-1 HSS	212	0.125	0.033	19.67
Conventional	SAE-3150	18-4-1 HSS	110	0.150	0.011	12.8
New	SAE-3150	18-4-1 HSS	110	0.150	0.011	195.6
Conventional	416 Stainless	18-4-1 HSS	160	0.150	0.011	6.4
New	416 Stainless	18-4-1 HSS	160	0.150	0.011	163.4
Conventional	AISI 3140	18-4-1 HSS	140	0.150	0.011	24.0
New	AISI 3140	18-4-1 HSS	140	0.150	0.011	339.5 pc/grind
Conventional	Inconel M	Carbide	67	0.220	0.0065	91
New	Inconel M	Carbide	67	0.220	0.0065	314

***TOOL-LIFE DATA** show the increases, fantastic in most cases, that resulted from replacing conventional cooling with jet cooling. Greatest gain was with stainless steel.*

Here's How the System Is Set Up for Turning



***CUTTING FLUID** is pumped from the regular supply in the lathe sump through a filter, then by flexible tubing to the high-speed jet mounted on the lathe carriage. Pressure control valve allows fluid to be pumped to overhead supply also. Curtain of oil from shower head positioned over tool and cutting area eliminates dense clouds of vapor and smoke generated by high cutting temperature at the tool nose. Oil curtain gives good visibility.*

speed jets apply the fluid in the wedge-shaped space between the side-relief face of the tool and the rotating work. This space, near the cutting edge, gets down to 0.000010 to 0.000001 in. in breadth. So resistance to flow is extremely high.

At flow velocities under 5 ft. per sec., the energy is too low to penetrate into the region near the cutting edge. Also, when jets are larger than the gap between the heel of the tool and the work, there is lateral splash near the bottom of the tool; this splash interferes with the main stream. Gulf therefore went to small jets—0.010 in. in dia. and somewhat larger.

A considerable volume of vapor and smoke generated during cutting shows that the fluid is boiling near the cutting edge. The vapor then presumably passes the edge of the tool and is recondensed on top by the cooler work and the chip. This fluid then lubricates the cutting edge.

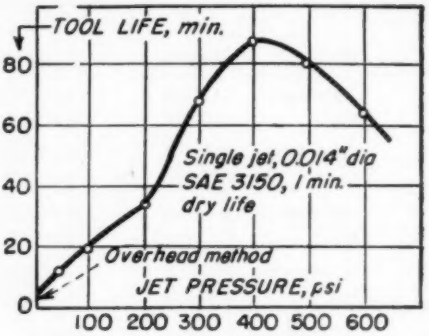
The vapor, in passing the tool's edge, goes up through tiny channels caused by difference in roughness between cut face and tool. Proof that oil passes the edge is shown by:

- Elimination of buildup.
- Uniform chip crater.
- Little nose wear.
- Failure by washout farthest from the jet on the cutting edge.
- Finish greatly improved.

So much vapor and smoke are developed that Gulf had to find a way to control it. A curtain of oil from a shower head and a jet on top the tool from the conventional supply pipe would keep down the vapor and smoke satisfactorily.

The table on page 51 gives tool-life data with various materials, tools, and speeds. The most startling difference in tool life was shown on type 416 stainless steel. With conventional cooling, tool life under the conditions designated was 6.4 min. The new method raised tool life 25 times to 163.4 min. with the same speed, feed, and depth of cut.

Jet-Speed Effect



***TO DETERMINE** effect of jet speed, tests were run at pressures from 25 to 600 psi. No improvement shows up to 50 psi. Best results were obtained at 400 psi.*

The Inconel M test was run on carbide tools with soluble oil in the overhead flood system and a special oil in the jet system. All other tests were run with the same type of oil in both systems.

It was discovered early in the research program that conventional cutting oils are not the best fluids for jet cooling. Soluble oils are not suitable lubricants, are difficult to pump at the high pressures involved (about 400 psi.), and lack certain other desirable properties.

After more than 100 cutting oils of different types were tested, an oil was developed that gives twice as good results as any other oil tested. This oil will be marketed.

The jet cooling method, while not yet proved by experience, may affect production rates considerably. Preliminary tests show that the method may also have an important application to grinding, especially to thread and cutter grinding.—Am Mach, Jan 21, p281

New Rolling Mill Developed to Speed Tapered Sheets

Joint development work by the U. S. Air Materiel Command, Reynolds Metals Co., and Aluminum Company of America has outlined a rolling mill that can mass-produce tapered skin sheets up to 10 ft. wide. Maximum sheet thickness will be 1.5 in.; minimum sheet thickness will be 0.030 in. Maximum taper ratio will be 4½ to 1.

A conventional rolling mill can be used. Operation of the roll screw-down mechanism is synchronized with the mill-roll velocity. The upper roll thus moves upward or downward at a constant rate relative to the velocity of rotation of the rolls. Three methods may accomplish this: hydraulic, electronic and electrical. At present, a study of all three methods is being made.

Cycle rolling of a long strip is possible. By this method, a large number of individually tapered sheets can be obtained by cutting the strip at the high and low points.—Aviation Wk, Feb 4, p47

Glass-Fiber Highlights

Unique combination of properties makes fibrous glass a major basic raw material. Glass and plastics, for instance, make a good team. They go into skiis, chairs, radar housings, rocket heads, airplane noses, battery separators, even boats (up to 28 ft. long).

Glass fiber has proved successful also for packing asparagus, in life preservers, as insulation on traction motors of diesel locomotives. Thousands of miles of glass fiber wrapping are on oil and gas pipe lines. Glass fibers are going into upholstered furniture, and it is being tried as cords in tires, in roofing, and as twine in hay balers.—Ceramic Ind, Feb, p71

Convention Calendar

(Equipment Exhibited)

May 1-7 — American Foundrymen's Society International Foundry Congress and Show, Atlantic City, N. J.

May 5-16 — British Industries Fair, London and Birmingham, England.

May 6-9—Fourth International Lighting Exposition and Conference, Cleveland, Ohio.

June 2-13 — Canadian International Trade Show, Toronto, Canada.

June 16-20—American Electroplaters' Society Show, Chicago, Ill.

Sept. 5-14 — Washington Far East Trade Fair, Seattle, Wash.

Sept. 22-25—American Mining Congress Mineral Mining Convention and Exposition, Denver, Colo.

Oct. 6-11 — Seventeenth Southern Textile Exposition, Greenville, S. C.

Oct. 18-20—National Metal Congress and Exposition, Philadelphia, Pa.

Oct. 20-24—National Safety Council Exposition, Chicago, Ill.

Oct. 20-25—National Business Show, New York, N. Y.

Nov. 6-8—American Association of Textile Chemists and Colorists, Boston, Mass.

Nov. 30-Dec. 5—Exposition of Power & Mechanical Engineering, New York, N. Y.

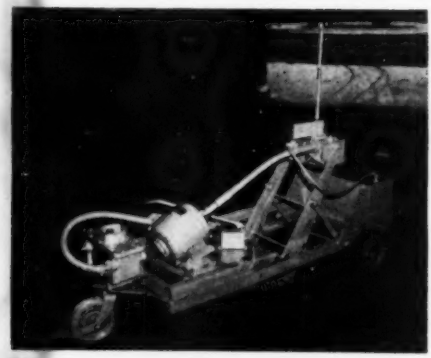
If you are interested in any of these expositions, either as a possible equipment exhibitor or as a visitor, the McGraw-Hill Digest will be glad to furnish additional information.

NEW EQUIPMENT...

Economical Spray Gun—Electrospray is a lightweight self-contained paint spray gun. There is little or no paint fog or spray dispersion. All that is needed for operation is the paint and an electrical outlet.—**Philip Loris Co.**—Factory, Jan, p150

Tests Paper Strength—Model 96A gage measures bursting strength of paper on Mullen or Cady testers. It is available in dial sizes of 3 in. for 120 lb. and 4½ in. for 1,000 lb.—**Ashton Valve Co.**—Paper Ind, Jan, p1227

Combustible-gas Alarm — Model EE alarm, completely explosion proof, can be installed in suspected atmosphere, indoors or out. Electronic trigger-tube circuit converts sensing-unit signal into alarm signal of red indicator light. Standard alarm point is 0.2 of lower explosive limit.—**Johnson-Williams Ltd.**—Elec World, Feb 11, p138



SELF-CONTAINED ROOF DRILL

New unit announced by the Crichton Co. is an inexpensive wet rotary roof drill with true vertical lift and a 30-in. tool pass mounted on a pneumatic-tire carriage. Drill head is powered by a short flexible shaft from a 3-hp. motor. Other features: 600-rpm. tool speed, 16-gal. water tank, and manual operation by hydraulic lift.—Coal Age, Feb, p122

High-pressure Pump—Model A313B pump is rotary, positive displacement type that operates up to capacities of 80 gal. per min., pressures to 275 psi., and intermittent pressures to 325 psi. It handles light or viscous fluids in hydraulic systems, oil burners, similar services.—**De Laval Steam Turbine Co.**—Oil & Gas J, Feb 4, p94

Electronic Scale—New scale checkweighs filled containers. It also can classify products into various weight groups or zones. It handles weights from 4 oz. to 10 lb. and classifies into eight zones.—**Toledo Scale Co.**—Iron Age, Feb 7, p166

Attachment Handles Drums—Horizontal device can be attached to any fork truck without removing forks. It slips over forks and is clamped by two screws. One or two drums can be picked up at a time. Clamps are spring loaded to hold drums. —**Yale & Towne Manufacturing Co.**—Am Mach, Feb 4, p164

Cutting Factory Noises—New acoustical baffles hang vertically from wires on the ceiling. They can be hung from any ceiling. Baffles measure 24x48 in. and are completely enclosed in a plastic film. —**Owens-Corning Fiberglas Corp.**—Business Wk, Feb 9, p54

Aluminum Kettle—Self-contained, gas-heated sanitary kettle is claimed to save up to 50% cooking time on meats. Shrinkage is held to minimum. Kettle can also be used for preparing fresh fruits, vegtables, and pie fillings.—**Aluminum Cooking Utensil Co.**—Food Eng, Feb, p129

Slip Ring Motor—Variable speed and high starting torque on low starting current make motor suitable for cranes, fans, printing presses, crushers. End bell is flat, thereby eliminating usual protrusion and reducing over-all length. Sizes are ¾ to 15 hp.—**Reuland Electric Co.**—Prod Eng, Feb, p230

. . . AND MATERIALS

MOVING-COIL THERMOMETERS

New line of resistance thermometers give accurate readings from —100° to 300° F. Basic mechanism is crossed-coil moving element and 3¼-lb. Alnico V magnet. Made by General Electric Co., thermometers are available as indicator, two-position controller or protector, and three-position controller.—Power, Feb, p160

Improves Hosiery Elasticity—New elasticity has been achieved in welts of seam-free nylon stockings by a new attachment for 400-needle nylon-hosiery machines. Device lowers and raises left stitch cam to lengthen stitches in every alternate course or in every fourth course. Lengthened stitches provide a stretch that makes for a closer fit.—**Scott & Williams, Inc.**—Textile World, Feb, p182

Multiple Induction Heater—Multiple 2½-kw. units allow heating stations at any place in a production line. Heating sections are remote from power section.—**Induction Heating Corp.**—Auto Ind, Feb 1, p78

Plug-in Panelettes—Units are now available with either lugs or circuit-breaker mains from 2 to 40 circuits for use on a-c. lighting or appliance circuit applications. Circuit breakers are rated at 15, 20, 30, 40 or 50 amp.—**Square D Co.**—Elec World, Jan 28, p202

Secures Tie-plates—Steel shoe of gaging machine is kept in correct alignment and at right distance from opposite rail by two flanged dollies on that rail. Runner guides plates to proper gage distance between railheads.—**Nordberg Mfg. Co.**—Const Meth & Equip, Feb, p121

Anti-Corrosion Piping—Pipe and fittings are available in cellulose acetate butyrate for process use. Tradenamed Tenite II, it has withstood corrosion from salt water, sour crude oil, corrosive earth, and electrolytic action.—**Tennessee Eastman Co.**—Chem Eng, Jan, p190

Sharpens Knives—New knife sharpener is adjustable for all types of cutlery. It can be used as general utility bench grinder, drill sharpener, and buffer or polisher.—**Fate-Root Heath Co.**—Hardware Age, Feb 7, p176

Easy-to-open Ampoule—Blue ceramic band around ampoule's neck makes it possible for user to open it without scoring. Ampoule is made of chemical-resistant borosilicate glass.—**Owens-Illinois Glass Co.**—Mod Packaging, Jan, p134

Protects Underground Pipe—No. 21 plastic electrical tape provides anticorrosion protection for underground pipe, cables, and equipment. It also protects cable and leads subject to hard wear. Dielectric strength is 22,500 v. Insulation resistance is 200,000 megaohms.—**Minnesota Mining & Mfg. Co.**—Elec West, Jan, p35

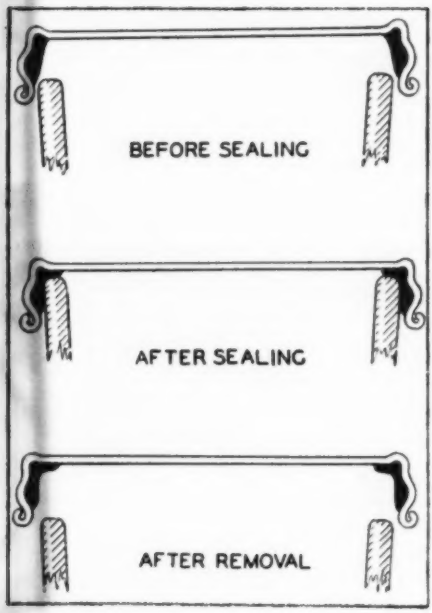
Tractor for Order Assembly—Load-Mobile tractor was designed for efficient warehousing and stockroom operations. Low platform makes it easy for operator to get on or off as he gathers orders.—**Market Forge Co.**—Factory, Feb, p182

Adjustable Drafting Table—Leveling device allows new drafting table to tilt anywhere between 0 and 50°. Table size is 42x72 in.—**Emrick, Inc.**—Am Business, Jan, p59

NEW EQUIPMENT (Cont.)

Rectifier Tubes—Two high-voltage oil-immersed rectifier tubes are 40-kv. and 125-kv. peak-inverse-voltage tubes rated at 150 and 300 ma. average. Larger tube is intended for dust precipitation unit.—**Westinghouse Electric Corp.**—Electronics, Feb, p272

Mildew Proofing—New fungicide makes possible one-bath treatment for textiles requiring both mildew resistance and water repellency. Fungicide contains solubilized copper 8-quinolinolate and water repellents.—**Nuodex Products Co., Inc.**—Textile World, Feb, p188



NEW THREE-POINT CLOSURE

Food-jar closure adopted by Kraft-Walker Cheese Co., Pty., Australia, provides a conformable flowed-in gasket with three-point sealing. A special vinyl chloride resin formulation makes up the sealing compound. Gasket conforms to side, corner, and top of jar. Dewey & Almy Chemical Co. developed the resin.—Mod Packaging, Jan, p92

Non-alkaline Cleaner—Steam-cleaning compound will not dull or streak good paints or attack aluminum and other soft metals. Liquid concentrate generates no objectionable fumes.—**Magnus Chemical Co.**—Rail Mech & Elec Eng, Feb, p106

Hose-coupling Machine—Permanent hydraulic hose assemblies are easily made with new desk-size machine. Users of hydraulic hose can save time and reduce costs by making their own hose assemblies.—**Arco Equipment Co.**—Bus Trans, Feb, p160

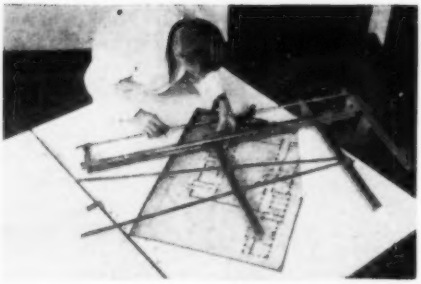
Enamel Resin—Uformite M-311 is a baking-enamel resin designed for white enamels on kitchen appliances. Composition is alkyd-modified triazine formaldehyde.—**Rohm & Haas Co.**—Chem Wk, Feb 2, p40

Coal Haulers—Designed for specialized service in strip mining, new trucks are powered by 165-hp. diesel engines and have 12 forward speeds, three reverse. Special coal bodies have 25-yd. capacity.—**White Motor Co.**—Coal Age, Feb, p125

Line-type Purifier—Hi-ef purifier removes solids from exhaust-steam installations to avoid fouling of automatic regulating equipment. Other uses: remove condensate from air lines, deliver clean steam for food processing, prevent line scale and liquid contamination in gas and air lines.—**V. D. Anderson Co.**—Power, Feb, p186

Capacitor-start Motors—Integral-horsepower, capacitor-start motors, ranging from ¾ hp., 1,140 rpm. to 3 hp., 3,450 rpm., are suitable for machine tools, pumps, fans, blowers, farm equipment. Starting switch is housed in external dust-proof chamber.—**Hoover Co.**—Elec C&M, Feb, p118.

Protects Metal—New rust preventive paint dries in 10 min., withstands temperatures from −100 to 250° F., and is highly resistant to salt air and fumes. Product covers old metal with one coat.—**United Laboratories, Inc.**—Aviation Wk, Feb 4, p59



NEW DRAFTING INSTRUMENT

German-designed drafting instrument "translates" plans and elevations into perspective drawings, the nature of which is not dictated by the available blueprint, but is completely up to the draftsman. Possible applications are in architecture, city planning, major building construction, ship building, and graphic arts. Perspective, direction, and height from which viewed can be selected at will. Franz Kahlmann of Wilhelmshoven makes the instrument.—Eng News-Rec, Jan 10, p47

Machines Pump Bodies—Special machine bores, drills, chamfers, reams oil-pump bodies at rate of 95 pieces per hr. with only one operator. Features: six stations, fluid motor drive on trunnion, hydraulic feed, preset tools.—**Cross Co.**—Am Mach, Feb 4, p153

Welding Coupling—Made of forged halves ready for welding into piping systems, coupling eliminates welding scale from systems. Other advantages: easy reuse, low pressure drop, leakproof joint. Sizes are 1¼ through 12 in.—**Tube Turns, Inc.**—Power, Feb, p 162

Lubricates Wire Rope—New wire rope lubricant, Texaco Crater A, permits application to wet wire rope. Lubricant remains pliable under a wide range of temperatures.—**Texas Co.**—Marine Eng, Feb, p120

Closes Cartons—Automatic carton closing machine folds and closes wide variety of open-top type cartons. Speed is 30 to 100 cartons per min. on lined or unlined cartons in continuous operation.—**Peters Machinery Co.**—Food Eng, Feb, p131

Air-operated Elevator—Portable elevator, powered by air-motor hoist operating from a compressor, is intended for service in hazardous explosive areas. Air consumption is about 2½ cu. ft. per min. per ft. of lift. Capacities are available up to 2,000 lb.—**Barrett-Cravens Co.**—Oil & Gas J, Jan 21, p126

Measures Surface Temperatures—New thermometer may be fastened to any flat surface with either silicone grease or magnetic clamp. Both are supplied with thermometer. Range is 0-300° F.—**Pacific Transducer Co.**—Mod Plastics, Feb, p143

Automatic Speed Controller—Mechanical automatic control is available in Series 1,000 fractional hp. Vari-Speed Motordrives. Speed variations are up to 10 to 1. Sizes are ¼, ⅓, ½ and ¾ hp.—**Reeves Pulley Co.**—Ind Dist, Feb, p133

Air Conditioners—Models 33, 50, and 75 are window-type machines for rooms up to 230, 325, and 485 sq. ft., respectively. Capacities are 4,200, 6,100, and 8,100 Btu. Conditioners also dehumidify the air.—**RCA Victor Div., Radio Corp. of America**—Elec Merch, Feb, p127

Hydraulic Jack — Simplex center-hole puller, 600-ton capacity and operating on a 10 hp. motor, is double-acting. Jack pushes or pulls in a straight line, vertical or horizontal.—**Templeton, Kenly & Co.**—Fleet Owner, Feb. p84

Drip Soldering—Mogul soldering gun drips liquid solder onto part moving under gun nozzle at speeds up to 200 ft. per min. Solder is fed as wire and melts in center of conical flame.—**Metallizing Co. of America**—Weld Eng, Feb, p47

READER SERVICE

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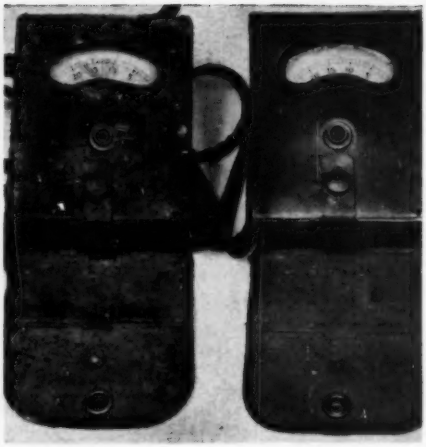
MILDEW grows on part of book that was not treated with Fungicide G-4.



TREATING meter case (right) with paranitrophenol keeps it damage free.

Chemicals Control Fungus

Large market demand for effective fungicides has meant development of several types of chemicals for different services

FUNGUS CONTROL is not only a problem in the tropics. While it is true that mold damage is most prevalent in areas of heavy rainfall and high humidity, mold may grow even in desert regions. And it will grow in cold areas too; U. S. government equipment for shipment to Alaskan bases is preserved from fungus deterioration.

But fungus can be controlled. Proper treatment by fungicides can prevent fungus damage to leather, rope, clothing, canvas, electronic instruments, food, cosmetics, paint, paper, and many other materials.

Copper naphthenate—Most important of industrial fungicides is copper naphthenate, a bluish-green waxy solid. Main use is to treat canvas and wood, but house owners, nurserymen, and farmers too find it valuable. It is soluble in mineral spirits, kerosene, waste crankcase oil, and creosote.

It is water resistant, but it also stiffens fabrics, colors them, has an unpleasant odor, and bleeds through paint.

Copper-8-quinolinolate—This is the most interesting newcomer to the industrial preservative field. Its high resistance to deterioration by sunlight offers a great advantage over other copper compounds.

Copper-8-quinolinolate is insoluble in common solvents, but Scientific Oil Compounding Co. has developed solubilized compounds, called Cunilates, that do dissolve in common solvents. Other copper-8 manufacturers are Nuodex (Quindex) and Interchemical (Milmer Dispersion).

Copper 3-phenylsalicylate—This compound was developed by Dow Chemical

Co. for awnings, tarpaulins, shoe liners, shade cloths. It is an effective fungicide that does not accelerate deterioration of cellulose by sunlight. Application is by emulsion or the two-bath process with a water-repellent binder.

Zinc compounds—While zinc compounds are not as powerful as copper compounds, they have the advantage of being colorless. Zinc naphthenate is therefore used for awnings and textiles where copper's blue would be objectionable.

Zinc oxide serves in paint as both a mold inhibitor and pigment. Zinc chloride and chromated zinc chloride are valuable in wood preservation if leaching resistance is not essential. Cellusan, made by Fungitrol Chemicals, Inc., is recommended as a colorless, odorless preservative for wooden food containers.

Mercury compounds—Organic mercury compounds are powerful microbial inhibitors. Phenylmercuries are about ten times as effective against both bacteria and fungi as mercury bichloride.

Mercury compounds are expensive, but a low concentration controls mildew in a wide variety of products from face paint to house paint. Organic mercurials are applied also to slime control in paper-pulp processing. They are active against both bacterial and fungal compounds of the slime.

Other uses include prevention of sap stain of freshly cut lumber by Du Pont's IN-2555, a 10% solution of phenylmercuric oleate; mildew resistance in oil-based paints by phenylmercuric oleate, phenylmercuric stearate, and cresol-mercuric naphthenate; protection of cork, rubber, paper, wood, leather, and wax.

Phenolics—These compounds include chlorinated, brominated, nitrated, phenylated, and benzylated derivatives of phenol, cresol, and xylenol. Most important phenol is pentachlorophenol (Monsanto's Santophen 20, Dow's Dowicide 7). Cheap and powerful, it is excellent for pressure treating of lumber. Other uses: paper-mill sanitation, preservation of adhesives and rubber latex, and mold-proofing of water-type paints.

A phenolic resistant to leaching from cloth is dihydroxy-dichloro-diphenyl methane, known as Fungicide G-4 or dichlorophene (Sindar). It is colorless, does not irritate the skin, but is expensive and applied to specialized jobs.

Another large-volume phenolic preservative is paranitrophenol. Big use is for military shoes and leather goods. Amount needed is 0.3% of leather weight.

Amine derivatives—The last 2 years has witnessed considerable interest in the salts, complexes, and reaction products of amines for use as fungicides. They include long-chain amine salts, such as dodecylamine lactate and salicylate, as household germicides and fungcides; the dodecyl amine salt of pentachlorophenol as a paint preservative; and quaternary ammonium salts of oil-soluble organic acids, such as oleic and naphthenic.

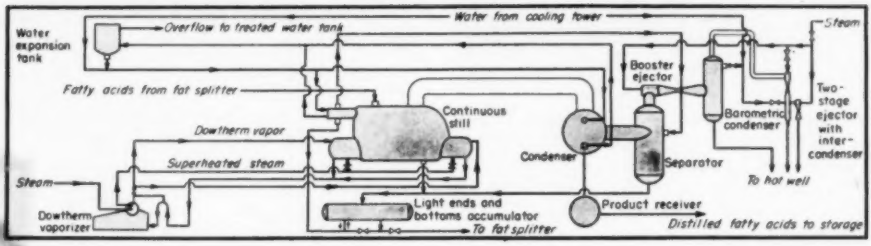
Other valuable amines are rosin amines with copper and zinc. They are useful in fireproofing compositions.

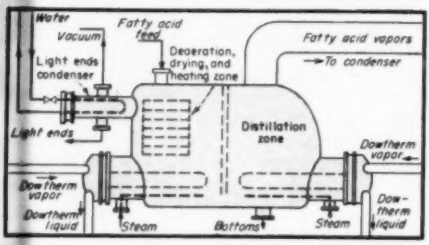
Mercury-amine complexes are highly active fungicides. Phenyl mercuric triethanol ammonium lactate, an effective fabric preservative, becomes insolubilized in the fibers as diphenyl mercury when it dries.

Other fungicides—Certain rubber accelerators are good fungicides. They include zinc dimethyldithiocarbamate, tetramethylthiuram disulfide, mercaptobenzothiazole, and tetrachlorobenzoquinone.

An odorless, colorless, tasteless fungicide is Dow's DHA—dehydroacetic acid. Its low toxicity to human tissues makes it valuable for cosmetics, in dips or sprays for fruits and vegetables, and in wax-paper wrappings for bread and other food.—Chem Wk, Jan 26, p21

Low-Cost Still Makes Color-Stable Fatty Acids





FATTY ACIDS for use in manufacture of plastics, candles, toilet soaps have to be light in color. This process, developed by Foster Wheeler Corp., removes low-boiling fractions of "light ends" that tend to darken. In two-stage still, light ends are removed along with stripping steam in left-hand zone. Dehydrated stabilized fatty acids are distilled in other zone, passed to condenser, then to storage. Still is suitable for unstable stocks because of low distillation temperature.—Chem Eng, Jan, p163

Vibrating-Plate Viscometer Is Fast and Accurate

An electronic viscometer measures the viscous damping that the liquid under test exerts on a flate plate oscillating in the liquid. Measurement is made by coupling the plate to a resonant mechanical system and comparing the amplitudes of vibration with and without the liquid damping.

The plate, made of stainless steel, is 0.01 in. thick, circular in shape with a 0.2-in. dia., and connected by a steel reed to an electro-magnetic transducer. Vibration amplitude is measured by ceramic barium titanate blocks mounted on both sides of the reed.

Reed motion causes the barium titanate to flex and generate a voltage at electrodes on its surface. This voltage is proportional to the amplitude of vibration and serves as a measurement of the vibration.

Range of the viscometer includes acetone and alcohol at one end and cup grease and petroleum at the other. Instrument accuracy is within $\pm$ 5%. The measurement can be made in seconds or continuously.—Electronics, Feb, p98

Strips Grease and Colloids

Buckley, Dunton Pulp Co., Inc., has developed a new grease recovery method using dissolved air. Instead of letting grease go down the sewer, meat packing plants can recover 90% of the grease for making glycerine and soap.

Air is dissolved into the liquid waste under pressure. Reducing the pressure to atmospheric releases millions of tiny air bubbles. As the bubbles float to the surface, they fasten onto tiny solid particles in the liquid waste and saturate larger clumps. The bubbles carry the solids to the surface. After that, it is easy to skim the solids off.

For colloids, a chemical that precipitates the material is added before the air.—Business Wk, Feb 9, p51

New Waste Recovery Process Makes Pear Waste Saleable

Pear waste is now being converted to saleable molasses and dried pulp for stock feed at a new waste treatment plant built near San Jose, California. Results: profit instead of disposal cost.

Waste in the form of peels and cores is ground in a rigid-hammer disintegrator and pumped to a continuous treater in which lime raises pH to 8.5 to 9. The mixture flows into a large trough fitted with a bladed agitator.

Working the waste separates clear juice as gel particles shrink and harden. Waste is then pumped to a continuous, double-drum dejuicing press. Juice collects in pans under the presses while filter cake, deposited on the inside of the drum, is continuously worked between the drums under pressure.

The cake drops out onto a conveyor and is dried to make the stock feed. The juice is centrifuged to clarify it and then concentrated in a multiple-effect evaporator to produce molasses containing 70% total solids, of which 60% is sugar. In the 1951 season, 1,800 tons of pear waste was processed.

The plant was set up by the Department of Agriculture's Western Regional Research Laboratory in conjunction with the Canners League of California. It has been taken over by Pacific Biochemical Co.—Food Eng, Feb, p82 and 136

Protects Sewer Pipes

Hydrogen sulfide can cause disintergration of concrete sewer pipe. So Amercoat Corp. developed a protective coating of vinyl plastic sheet.

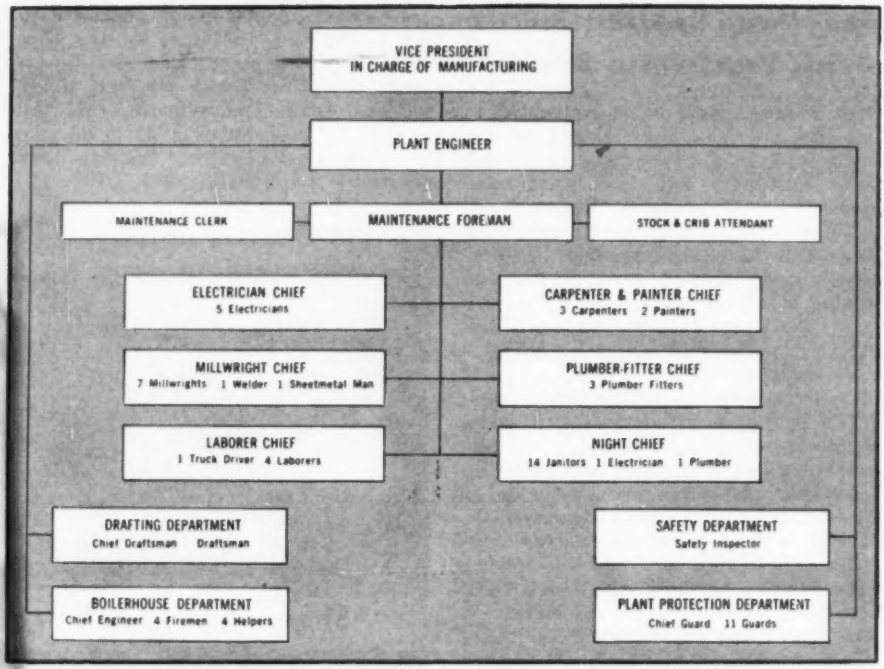
Sheets are 0.060-in. minimum thickness and up to 4x8 ft. in area. Individual sheets are welded together to make liners for any size or length of pipe. The smooth surface reduces friction.

T-shaped extensions on the back of the lining lock the liner to the pipe when concrete is poured. A hot-air torch welds the joints between lining sections. Linings have proved resistant to various concentration of acids, and to ammonia, gasoline, chlorine, and ethanol.—Mod Plastics, Jan, p102

Candid Camera Setup . . .

. . . Shows How To Sell

To show the druggist the possibilities of salesmanship, Bristol-Myers Co. decided to make a training film. But it wanted something different. So it hid a camera at a drugstore counter and hired a special salesman to do the selling. Sometimes he sold the product, other times he did not. With the film, the viewer can see how things look from the customer's point of view. He also sees the job that personal selling can do.—Business Wk, Jan 5, p78



***GOOD ORGANIZATION** starts with the plant engineer reporting directly to the vice president in charge of manufacturing. With this setup, the plant engineer can control 76 men.*

Key to Good Maintenance

This company picked good organization as the key to efficient maintenance, then it proceeded to make the organization work

GOOD ORGANIZATION is the key to good maintenance. The right combination of personnel, supervision, equipment, procedures, and paperwork make up good organization.

Perfection Stove Co., Cleveland, Ohio, provides an ideal case study of how good maintenance organization pays off. Three years ago, the company reorganized the maintenance department of its newly remodeled plant. Results to date have more than justified the effort.

Plant area was increased 175%. Considerable new equipment was added. And the company has improved maintenance of existing facilities—all without increasing the size of its maintenance force.

The cost of operating the maintenance department has only increased 25.2% during the past few years. This is low when expanded activities, higher material and labor costs, and a 50% increase in production hours are considered.

Perfection Stove Co.'s reorganization gave it a fine chance to discard some of its old ideas. It was able to start afresh with a new workshop, adequate tools, job accounting procedures, preventive maintenance, and other good maintenance practices. The new program was based on a composite of several successful systems. Necessary changes were made as the program progressed.

Type of Organization

The company chose the simplest type of organization, the line or military type, where authority flows down from the top and response comes from the lower levels to the higher levels. This system is simple and clear cut, but often autocratic. Thus it tends to shut off the contributions of the men at the lower levels. But to give everyone a chance to have his say, Perfection Stove Co. holds frequent conferences.

The chart shows that the plant engineer reports to the vice president in charge of manufacturing. This places maintenance on the same level with the production and inspection departments.

Plant protection and boilerhouse departments formerly reported to the maintenance foreman. In that relationship they could never compete against demands of plant maintenance men for a share of his time. By reporting to the plant engineer as they do now, plant protection and boilerhouse departments get proper recognition, and the maintenance foreman, relieved of their supervision, can concentrate on doing a better maintenance job.

Drafting and safety are staff adjuncts to the plant engineer's office. In these and all other operations Perfection Stove Co. believes in the departmentalized or specialist approach. It encourages individual effort that results in good departmental performance.

As a part of the new organization working group leaders, or "craft chiefs", were created. They have first-line supervisory powers.

Craft-chiefs supervise the work of their groups, approve job-time changes, and approve supply requisitions. They prepare daily job-tally sheets, handle secondary job planning and scheduling, and assist with job estimates.

This new craft-chief setup provides the benefit of a foreman for each group. For example, when a craft chief helps prepare a job estimate, he has to plan the job in his mind as well. This pays off in the elimination of delays when the job is under way, because the exact sequence of operations has already been determined.

The system needs one maintenance clerk and he is an essential cog. He receives all calls, and notifies the proper craft chiefs, supervisors, etc., depending on the action required. He prepares work requests, posts job costs, and maintains the files for the preventive maintenance file, equipment data, and such other records as are necessary.

Records enable Perfection Stove Co. to spot machines that require excessive maintenance. The workload ahead of each craft is known at all times. Job costs are obtained the day the work is completed, instead of a month later. Only by these and other records does maintenance know where it stands on a job. And records supply management with the facts needed for sound decisions affecting maintenance operations.

Rule: Good Organization

The chart shows that the lines of authority are definite and without overlap. But they allow for the training in depth necessary to enable key men to step out for vacations or illness, with little effect. Supervision in depth extends even to the craft chiefs—each chief has a man or two trained to take over whenever required.—Factory, Feb, p104

Flux-Bath Dip Brazing Joins Aluminum Alloys

In brazing aluminum alloys, heating in a molten salt bath controls time, temperature and contact variables, avoids joint corrosion from flux entrapment, and permits the bath to act also as the fluxing medium.

Parts to be brazed are cleaned in an alkaline bath or vapor degreaser, bright-dipped in acid, rinsed, and dried. Parts are assembled, brazing alloy is preplaced in the joint, and the assembly is heated in an electric air furnace at 950 to 1000° F. for 10 to 25 min. It is then transferred to the salt bath for 15 to 30 sec. at 1100° F.

Joint design is important. Best kind is a lap joint. Sound joints can be made consistently when clearances between mating parts are about 0.002 in. Length of overlap rarely exceeds 1 in. A long overlap requires more joint clearance; a 1-in. lap should have 0.005 in.

Dip brazing of spot-welded parts should be avoided because faying surfaces may trap salts from the cleaning solution; trapped salts would then prevent satisfactory flow of filler metal.—Prod Eng, Feb, p173

POURING IT ON

Painters at New Kensington Works of Aluminum Co. of America cover fence with aluminum paint by pouring, instead of brushing. Panels fitted closely on each side guide paint down wire as it is poured. Excess drains into catchpans.—Const Meth & Equip, Feb, p44

Cuts Fabric-Laying Time

Adoption of a new taping technique has reduced a 3-hr. job to 8 min. for an Eastern silk-screen printing plant. The job involves laying fabrics on a printing table for a silk-screen process. Formerly six men hand-pinned the fabric in 30 min. Now two men lay the fabric in 8 min. with a special lay carriage and double-adhesive coated textile tape.

Tape and fabric are applied in this manner: (1) as carriage is pushed along table, two strips of tape are fed off the rolls and pressed firmly to the table's surface; (2) a roll of fabric is placed on the carriage, and, once tabbed to the tape, the carriage roller presses the fabric securely in place as the carriage is pushed along the table's length.

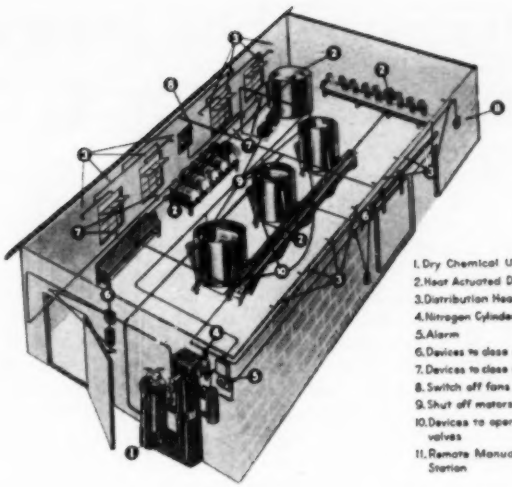
When the printing step is completed, the fabric is merely pulled away from the tape. The tape is good for 35 separate printing operations.—Textile World, Jan, p141

Field-Cleans Aluminum

To clean aluminum conductors in the field before splicing, Southern California Edison dips them first in a solution of 10% sodium hydroxide and 10% sodium chromate, then into 5% phosphoric acid, and finally a plain water rinse. Cleaning time is less than 5 min. The three solutions are placed in three telescoping tubes that are slotted at the top and held together like a tripod by a ring.—Elec World, Jan 28, p172

PAINT-ROOM FIRE PROTECTION

Automatic piped system, developed by Ansul Chemical Co., protects industrial installations, such as this paint mixing room, against flammable-liquid and electrical-equipment fires. If fire starts, heat-actuated devices, by air expansion, reports fire to nitrogen-cylinder release. Nitrogen then pressurizes dry chemical tank to discharge chemical (specially treated sodium bicarbonate) onto flame. Carbon dioxide and water vapor created smother flames. Windows and doors close automatically.


1. Dry Chemical Unit
2. Heat Actuated Devices
3. Distribution Heads (Nozzles)
4. Nitrogen Cylinder Releases
5. Alarm
6. Devices to close doors
7. Devices to close windows
8. Switch off fans and blowers
9. Shut off motors
10. Devices to open drain valves
11. Remote Manual Control Station

Corn-Cob Processing Meets High Furfural Demand

Need for furfural is high because of greater production of synthetic rubber, nylon, other defense products. Helping fill this demand is Quaker Oats Co.'s new Omaha plant that has a capacity of 40-million lb. per year.

Raw materials for the plant are corn cobs, rice hulls, or cotton-seed hulls. They are mixed with sulphuric acid and charged into a rotary digester where pentosans hydrolyze to pentoses and then split out water to form furfural. Acetic acid, methanol, and other compounds that also form are distilled out.

Digester vapors are condensed, followed by azeotropic distillation of furfural. The water is decanted off, leaving the furfural, which is dried, cooled, and filtered before storage.

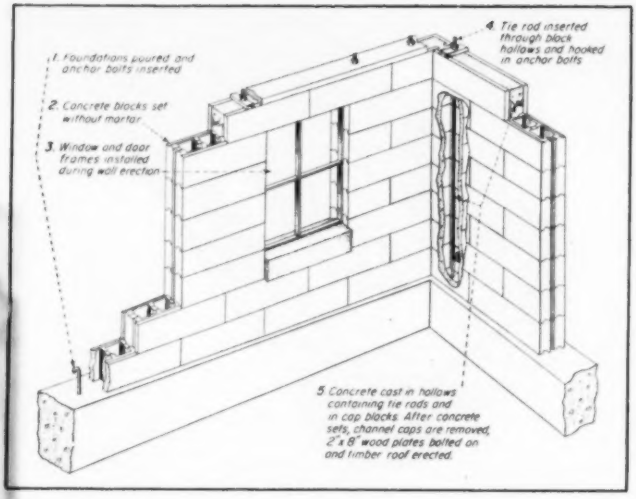
Principal uses for furfural are, in order of their importance: (1) chemical intermediates, (2) lube-oil upgrading, (3) synthetic resins, (4) furfural alcohol, (5) synthetic rubber, (6) resin-bonded grinding wheels. One of the newest applications is in refining of gas oils and removal of catalyst-poisoning sulfur compounds from catalytic cracking stock.—Chem Eng, Jan, p217

Successful Foil-Kraft Drum

The current steel shortage caused development of a good single-trip container for oils and greases that practically eliminates steel. Pacific Steelfiber Drums, Inc. fabricates the containers of multiple plies of aluminum foil laminated to kraft linerboard. Top and bottom of the drums are sheet steel—only steel in the container.

Foil is first laminated to the kraft and then wound convolutely to give six or more plies of foil. Five- and 15-gal. drums are being made. Thirty- and 55-gal. drums are being developed.

Cost of the foil-and-fiber drum is substantially less than that of a steel container. Weight savings are also substantial.—Mod Packaging, Jan, p105


1. Foundations poured and anchor bolts inserted
2. Concrete blocks set without mortar
3. Window and door frames installed during wall erection
4. Tie rod inserted through block hollows and hooked in anchor bolts
5. Concrete cast in hollows containing tie rods and in cap blocks. After concrete sets, channel caps are removed, 2" x 8" wood plates bolted on and timber roof erected.

MORTARLESS BLOCK WALLS

Walls of a building in Marietta, Ohio, are made of lightweight-concrete hollow blocks. Walls were erected without mortar. Tongue and groove edges and ends form interlocking joints. After wall was erected, steel rods were inserted at corners and alongside openings and hooked to the floor slab. Nuts at tops of rods were tightened against bearing plates until wall became rigid. Hollows of blocks were then filled with concrete.—Eng News-Rec, Jan 31, p31

Continued Annealing Makes Universal-Temper Tinplate

New continuous annealing line at U. S. Steel Corp.'s Gary Sheet and Tin Mill replaces batch annealing of tinplate. One advantage will be the "universal temper" that will be suitable for 85% of all cans made. It can replace four of the six different tempers required by canmakers.

Eleven separate processes are performed at stages along the line as 3,000-ft. strip passes through at 1,000 ft. per min. After electrolytic cleaning, scrubbing, and rinsing, the strip flows through a looping tower to a heating zone where it is brought up to 1325° F.

It soaks 10 sec., cools slowly in three stages between banks of air-cooled tubes to 1200° F., cools rapidly to 250° F. in water-jacketed chambers, and finally cools to 125 F. under an air blast. The strip is again looped in a tower and moved on to the finishing end of the line.

Total length of the annealing line is only one-tenth that of the 3,000-ft. strip being processed at one time. Rolls direct the strip into 27 vertical loops of varying size. Longer loops extend from pits 38½ ft. below ground level to 55 ft. above.—Iron Age, Jan 17, p51

New Three-Cylinder Diesel

A new two-cycle, three-cylinder diesel engine for trucks has been announced by General Motors Corp., Truck and Coach Div. Known as 3-71, the new engine is similar to the 4-71 and 6-71 diesels for larger trucks.

Certain engine parts are interchangeable with parts of other series "71" units. Among the common parts are: cylinder liners, connecting rods, pistons, piston rings, main and connecting rod bearings, valves, and fuel-injector assemblies.

Engineering improvements include a new fuel modulator. This unit automatically proportions fuel and air in the speed range below 1,600 rpm. O-rings seal oil and water passages.—Fleet Owner, Feb, p68

Textile Review and Forecast

Machines and processes improved, new fibres appeared, tests replaced trials, and woolen mills turned to synthetics in 1951

THE TEXTILE INDUSTRY saw many new developments in machinery, fibers and processes in 1951. What follows is a report on these developments and what can be expected in 1952.

Machinery Improvements — Except for several new major machines, 1951 was a year of gadgets. The gadgets—mostly small but good improvements in processing equipment — demonstrated the ever-pressing efforts of machinery manufacturers to experiment and modify toward the ultimate perfection of their equipment.

But 1952 promises major new machines. Research at Whitin Machine Works indicated that some of the present cotton-opening and cleaning methods were not only unnecessary, but actually detrimental to the fiber. Fewer machines and a reduction in fiber damage and nep formation will eventually result from this work.

Saco-Lowell, too, is working on the problem. A new machine under development, the trash ejector, is designed to beat out heavy impurities and float out light impurities.

Fibers, Old and New—Synthetic fibers dominated textile research in 1951 and very likely will do so again this year. Probably the most critical practical-research problem last year, and carrying over into 1952, was dyeing. Fiber producers, chemical companies, and mills engaged in experimental dyeing of the new synthetic fibers. Du Pont, for example, described an application of the copper-dyeing method to Orlon acrylic fiber. Satisfactory fastness in a full range of shades is said to be attainable.

The Ogden process for stripping and dyeing reused and reworked wool in a single bath was developed. Briefly, the routine is to load piece goods into a kettle in a cold bath and add in this order: (1) dye, (2) acid, and (3) strip. The bath is brought to a boil and held for 30 min. Then 10% calcined Glauber salt is added, and the boil is continued 45 min. Then goods are washed.

Rayon-cake dyeing for mills was explored from the angle of cost in comparison with skein dyeing. Capital investment for cake-dyeing machinery is high, but dyeing costs are about 3½¢ per lb. of yarn. For skein dyeing, costs are 15¢ per lb.

A new way to flameproof part-nylon fabrics (McG-H Digest, June '51, p24) was described by Du Pont. A resin treatment of thiourea formaldehyde will counteract the effects of the other fibers in the blend.

What makes a cotton fiber strong or weak was explored by Textile Research Institute. Two weak spots were found: (1) the points along the length of the fiber where the fiber reverses, and (2) points between these reversals where the fiber is weakened by structural faults such as kinks and splints.

Chemical modification of cotton for specific end uses continued during 1951; and the program goes on into 1952. Projects underway include rot resistance, heat resistance, water repellence, and increase of absorbency.

Textile Finishing—The year 1951 marked increased technical advances in the wet-processing field of the textile industry.

In the dye-application field, the molten-metal process (McG-H Digest, Nov '47, p52; Sept '50, p30) for the rapid fixation of vat colors has proved

a successful way to dye colors on all types of fabrics.

Another method for rapid fixation of vat, sulfur, and other types of dyes, is the hot-oil method. In this process, the cloth, after being impregnated with dye, is passed through a hot-oil bath.

In the detergent and finishing field, interest is increasing in the use of nonionic scouring, wetting, and softening agents. Many of these newer synthetic products combine the advantageous properties of both the anionic and the cationic materials and, being compatible with both, are proving a useful tool in general finishing.

Recently, Dan River Mills announced a chemical treatment for viscose. The treatment stabilizes fabrics made from this fiber, imparts good crush resistance, and prevents chlorine retention.

Woolen Mills Turn to Synthetics—Many woolen mills will not manufacture only 100% woolen yarns and fabrics; they will also use blends of wool and synthetic fibers and 100% synthetic fibers. The variety of synthetics is becoming greater every year, and many woolen mills will have to be equipped to handle all kinds of fibers.

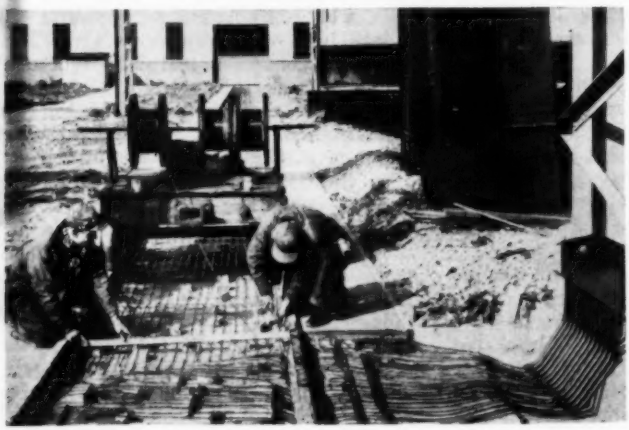
Synthetic fibers already used on the woolen spinning system are Vicara, Dynel, Dacron, Acrilan, Orlon, and a large volume of rayon and acetate. But natural wool will always have its place in the textile industry as long as sheep are raised.

Trial and Error out for Worsted Mills—Different types of evenness testers (McG-H Digest, Dec '51, p31) were introduced in 1951. Most mills have different methods of preparing yarn for spinning. Tests for these various methods will guide the way to better quality and lower costs. The testers will help mills to select the best method of spinning yarn for the yarn end use.

Pin drafters and the Ambler Superdraft received much attention during 1951. But, can long draft, as developed by Ambler, be obtained with a sliver without twist?

If the answer is "yes", any machine between the pin drafter and the spinning frame becomes unnecessary. The logical solution would be to go directly from the gill to the spinning frame.

If the answer is "no", machines that take an open sliver from the pin drafter and insert twist in the sliver, with good fiber control permitting, will be developed.—Textile World, Feb, p107



HEATING CABLE CLEARS RUNWAYS

Outdoor cranes at Bucyrus-Erie Co. operate all winter without trouble from snow and ice. General Electric heating cable was installed under concrete runways on wire mats about 2½ to 3 in. below surface. Mounting cable reels on flat car helped lay the 40,000 ft. of cable.—Elec C&M, Feb, p151

HELICOPTER WORKHORSE

Artist's view indicates how new Piasecki XH-16 could support ground forces by flying heavy artillery over river and mountain barriers blocking normal ground vehicles. First XH-16 is nearing completion. — Aviation Wk, Feb 11, p18

Sugar-Cane Wax Process

Getting wax from sugar cane is not new, but an Australian refining process has been developed that is claimed to:

- Give a more flexible wax that can be modified.
- Be able to take crude wax from different mills and turn out a uniform product.
- Produce a more attractive wax than the present one.

The new process replaces solvent extraction for refining crude wax. The crude is previously obtained by solvent extraction from press cake left over from sugar refining.

The process is carried on in three steps: (1) demineralization with hydrochloric acid, (2) vacuum distillation to remove components of lower molecular weight and (3) chromic acid bleach. Over-all yield from crude to refined wax is about 50%.—Chem Wk, Dec 22, p23

Dust and Fume Control

Multiple blasting and fog guns at the face reduce dust and fume production in Washington State coal mines.

Multiple blasting: Originally, each hole was loaded and fired individually. Heavy concentrations of dust and fumes resulted. Shot-firers or miners were subjected to hazards, and much time was lost. Multiple blasting with millisecond-delay detonators removed these disadvantages.

Fog guns: The gun is a piece of ¾-in. pipe, 19 in. long, flattened at the discharge end to produce a nozzle. Compressed air helps disperse the water in a fog-like mist.

The fog gun is installed 2½ to 7 ft. above bottom and 15 to 30 ft. from the face, and is pointed toward the center of the cut or section being shot. Air and water are turned on immediately before blasting and left in operation 3 min. after the shot.—Coal Age, Jan, p108

Gasoline-Refining Process

Promising new technique in gasoline treating refines cracked and virgin gasoline stocks with formaldehyde. Advantages of this Standard Oil Development Co. discovery include reduced losses, better lead susceptibility, greater product stability, and reduced corrosion characteristics in the fuel.

Purpose of the formaldehyde is to reduce certain undesirable components, such as polyolefins, dicyclopentadienes, some aromatics, and sulfur compounds. The process, which has undergone pilot-plant testing, is designed to substitute for sulfuric acid treating and the addition of antioxidants. Formaldehyde need is up to 1½% by weight.—Oil & Gas J, Feb 4, p38

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PRODUCTION IDEAS

from Manufacturers' Catalogs

4-1 Truck Trailers—Fruehauf Trailer Co. 52p. Booklet 120 describes in detail many body types available. Suspension systems and special trailers are covered.

4-2 Weather Control Systems — International General Electric Co. 60p. Booklet AM 42-1882 contains complete technical information on design of GE's weather control system and room air-conditioning units.

4-3 Hydraulic Fluid—Monsanto Chemical Co. 12p. Pydraul F-9, a new nonflammable-type hydraulic fluid, is described.

4-4 V-band Couplings—Marman Products Co., Inc. 48p. Catalog describes V-band couplings, how they work, and how to design for them.

4-5 Low-cost Materials Handling—Yale & Towne Mfg. Co. 16p. Bulletin P809 describes application, types, and operation features of motorized hand trucks and electric stackers.

4-6 Limit Switch Applications—Minneapolis-Honeywell Regulator Co. Vol. 1, No. 8, of "Micro Tips" tells how micro switches check thickness, position sheets, measure coal level, etc.

4-7 Universal Testing Machines — Riehle Testing Machines Div., American Machine & Metals, Inc. 32p. Catalog RU-7-52 describes hydraulic testing machines up to 400,000-lb. capacity.

4-8 Electronic Tubes—Milo Radio & Electronics Corp. 28p. Electronic tubes for all industrial applications are listed in catalog EB.

4-9 Orchard Sprayers—John Bean Div., Food Machinery & Chemical Corp. 56p. Booklet L-845-AAP describes all types and sizes of spraying equipment for growing better fruit.

4-10 Storage Batteries—ESB International Corp. 12p. Form 5161 gives construction details and specifications of storage batteries for motive power.

4-11 Dust Control Systems — Pangborn Corp. 54p. Booklet 908-46-1146 tells how industrial dusts can be controlled through exhaust systems.

4-12 Automotive Ignition Parts—Sterling International Corp. 48p. Ignition parts are listed for automobiles and trucks in catalog 151.

4-13 Continuous Grinding — Patterson Foundry & Machine Co. 28p. Ball, tube and rod mills for wet or dry grinding are illustrated in catalog 514.

4-14 Material Elevator—American Hoist & Derrick Co. 12p. Safe, efficient means of getting construction materials to where they are needed is described in catalog 250E1.

4-15 Better Grinding—Landis Tool Co. 84p. How to operate, set up, and maintain cylindrical grinders is cleverly told by cartoons in booket "Better Grinding".

4-16 Prevents Rust—Nox-Rust Chemical Corp. 24p. "How Book" tells what vapor wrapper packaging material is, how it works.

4-17 Chemicals Described—Union Carbide & Carbon Corp. 32p. Form 5863-I describes products and proceses offered by this organization.

4-18 Corrosion-resistant Fastenings—H. M. Harper Co. 56p. All types of bolts, nuts, screws, and rivets in aluminum, brass, and stainless steel are listed in "Stock Book of Fastenings."

4-19 Retaining Rings—Waldes Kohinoor, Inc. 28p. Bulletins 7 and 8 cover rings for radial assembly and basic-type rings.

4-20 Equipment for Basic Industries—Pioneer Engineering Works. Publication "Pioneer Continuflo Review," Feb. issue has intallation photos of basic industry equipment.

4-21 Cooling-coil Developments—Trane Co. 72p. Latest developments in extended surface cooling coils are summarized in bulletin DS-365.

4-22 Refractories—Carborundum Co. 20p. Facts and figures showing what super refractories can do are presented in form 5120.

4-23 Office Calculator—Marchant Calcu-

PRODUCTION IDEAS (Cont.)

lating Machine Co. 8p. Form EFA-3 describes features of Figuremaster calculators.

4-24 Protects Metals—Octagon Process, Inc. 8p. Folder describes Anchorite 100, a paint-anchoring corrosion-resistant phosphate treatment for metals.

4-25 Glass for Product Design—Corning Glass Works. 12p. Properties and applications of different glasses for industrial purposes are given in bulletin IZ-1.

4-26 Port Facilities—Port of Seattle. 32p. Brochure tells of facilities and services available in Port of Seattle.

4-27 Flow Control Systems—Fischer & Porter Co. 16p. Two catalogs, 53 and 100, describe automatic flow ratio controllers and flow rate calibrations methods.

4-28 Lift Trucks—Transitier Truck Co. 8p. Form 11 describes several lift trucks and illustrates their versatility.

4-29 Ladder-type Ditchers—Gar Wood Industries, Inc. 16p. Compact, maneuverable ditchers perform many construction jobs. Two pamphlets, 407 and 120, describe 8-ft. depth of cut and 16-ft. depth of cut machines.

4-30 High-vacuum Pumps—F. J. Stokes Machine Co. 32p. Catalog 700 gives design details and installation data for wide range of high-vacuum pumps.

4-31 Tractor-shovel—Tractor Div., Allis Chalmers Mfg. Co. 16p. Bulletin describes versatile HD-5G Tracto-Shovel. Equipment can function as tractor or shovel.

4-32 Diesel Engines in Use—Cummins Engine Co., Inc. 24p. Vol. VII, No. 1 of "Dependable Diesel" features case histories of diesel engines in many applications.

4-33 Hammermills — Myers-Sherman Co. 16p. Six sizes of industrial hammermills are described in pamphlet 3-51.

4-34 Coal and Ash Handling—Link-Belt Co. 44p. Booklet 2410 contains layout drawings and photographs of power-plant installations.

4-35 Glass-lined Piping—Pfaudler Co. 12p. Heavy duty glass-lined pipes, fittings, and valves are listed in bulletin 886.

4-36 Materials Handling—Hyster Co. 48p. Feb. issue of "Space" contains many interesting features. One tells how to train fork truck operators, another describes new products.

4-37 Air Conditioner — Remington Corp. 16p. Room air conditioners in various sizes are described in bulletin G-2.

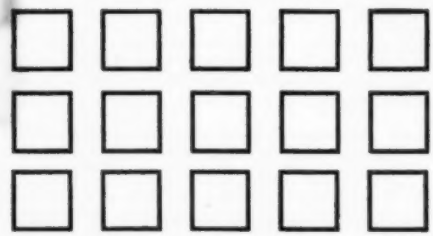
4-38 Power Factor Visualizer—Westinghouse Electric International Co. Slide-rule type chart explains use of capacitors; tells what low power factor is and what it means.

4-39 Coal-mine Welding—Eutectic Welding Alloys Corp. 16p. Book TIS767 covers welding in coal-mine maintenance.

4-40 Neoprene-treated Paper—E. I. du Pont de Nemours & Co. Inc. 16p. Properties given by neoprene latex added to paper pulp are discussed in bulletin A2092.

4-41 Blends Liquids—Bowser Inc. 12p. Folder "Precision Blending System" describes method for blending liquids.

These manufacturers' catalogs will be sent free to subscribers. Fill in squares with catalog numbers desired and mail to the Editor, McGraw-Hill Digest, 330 West 42nd St., New York 36, N. Y., U. S. A.



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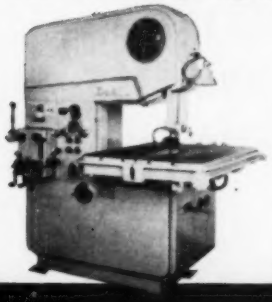

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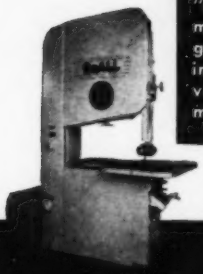

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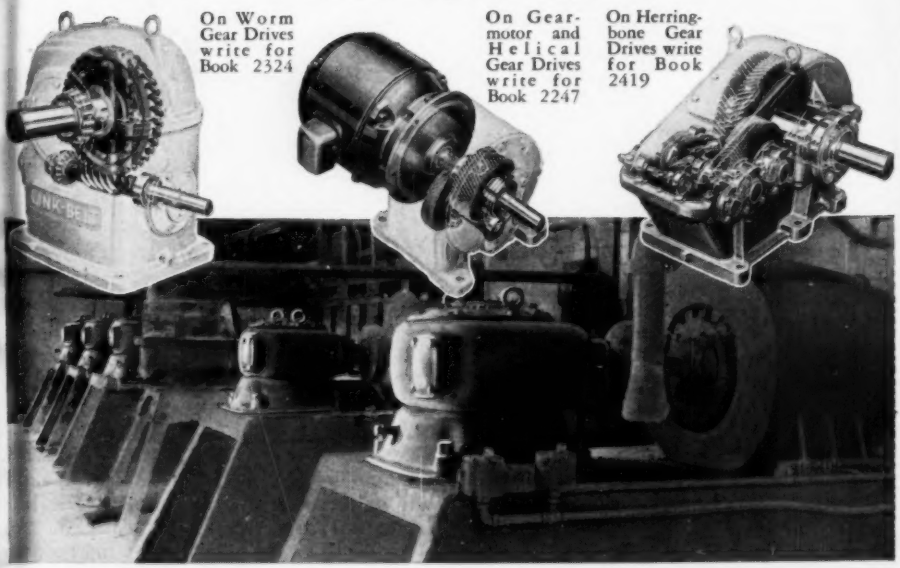

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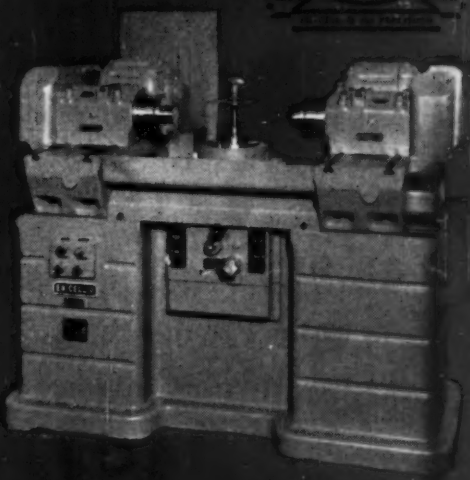

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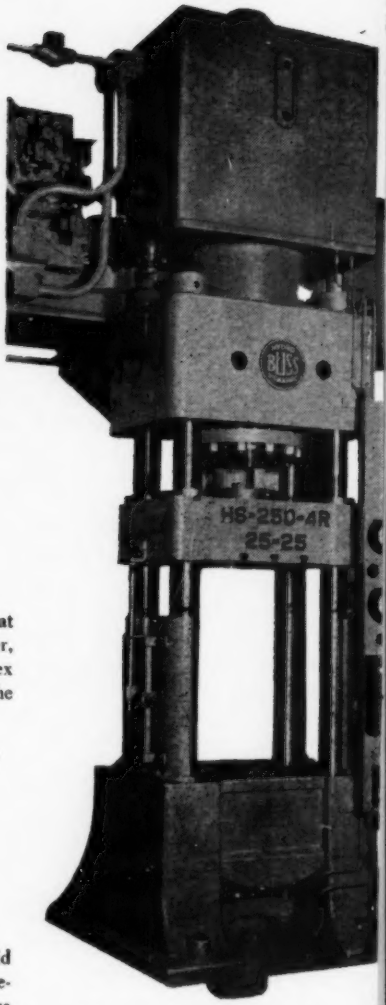

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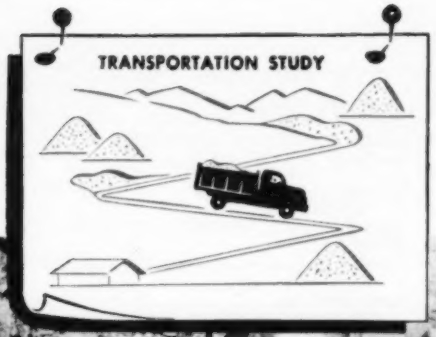

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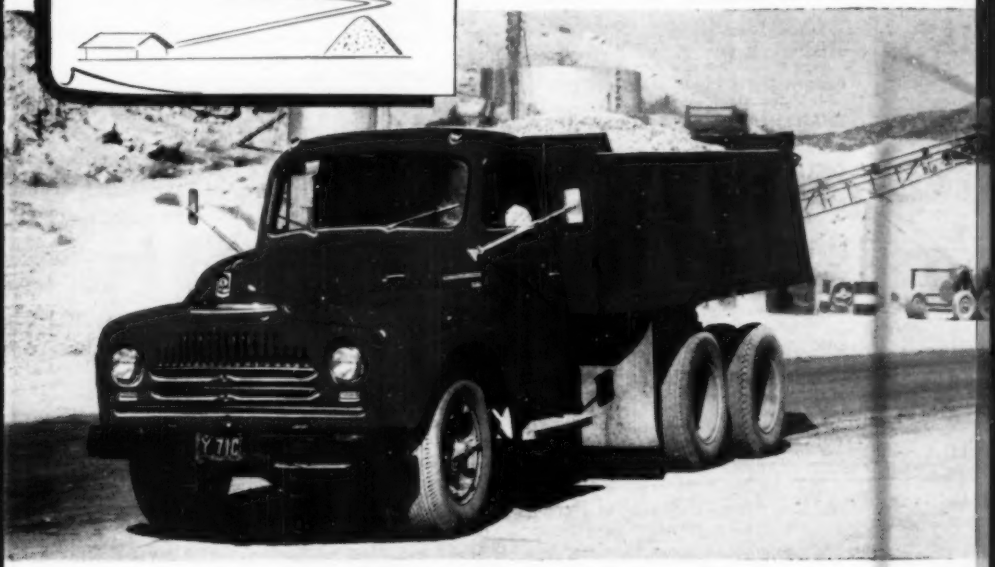

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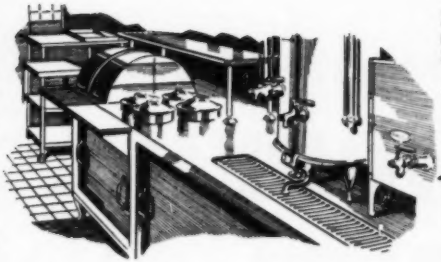

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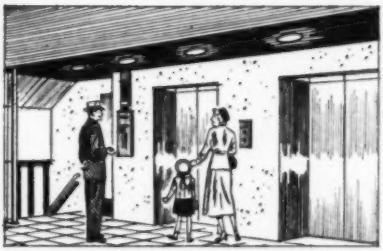

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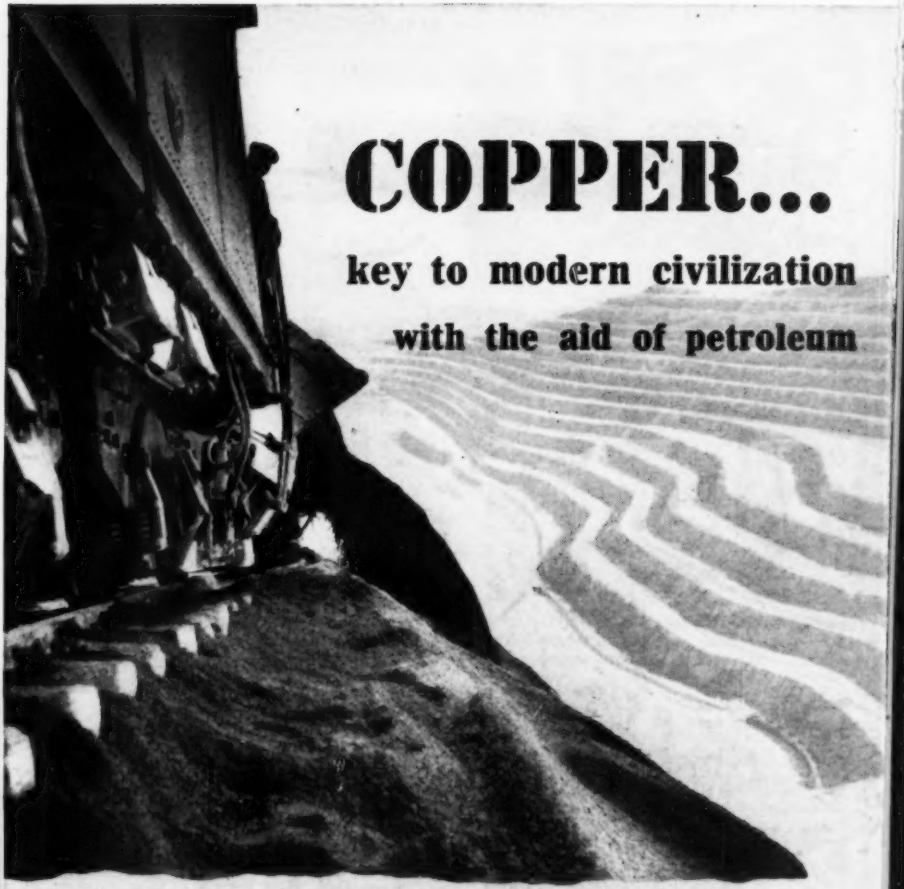

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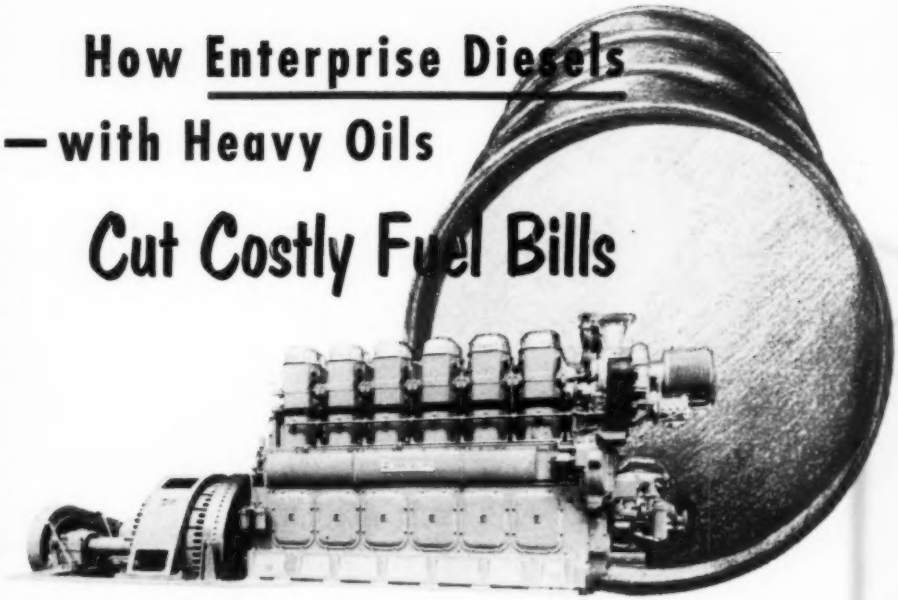

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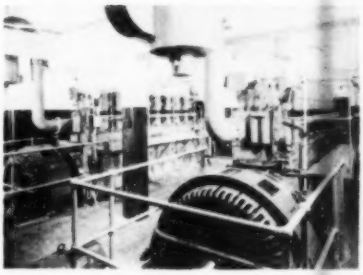

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